Appendix C

Purpose and Need / Alternatives Analysis

Noblesville East- West Corridor

Alternatives Screening Memo

Introduction

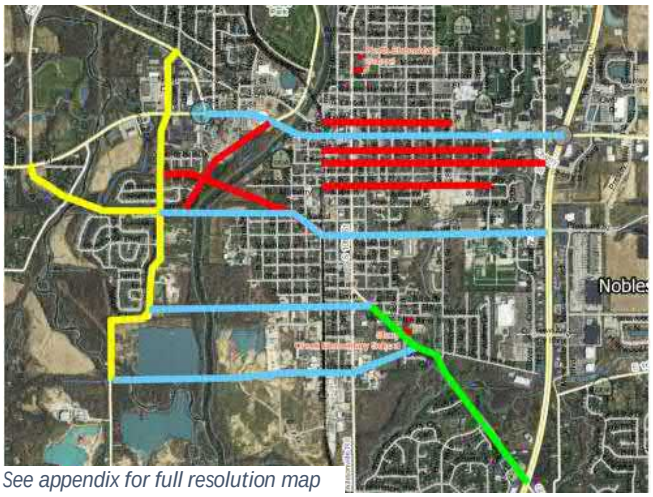
The City of Noblesville is proposing to advance a state-sponsored Environmental Assessment for an east to west corridor project through the city, from S.R. 37 to S.R. 32 across the White River. As the project anticipates receiving funding from the State of Indiana, environmental study for a reasonable range of alternatives is required by 329-IAC-5-1-4. The project may also be funded fully with local funding. If at a later date federal funding by the Federal Highway Administration (FHWA) is secured for the project, the environmental assessment will be re-visited in the context of National Environmental Policy Act (NEPA) guidelines. CHA Consulting, Inc., in partnership with American Structurepoint, Inc., is advancing this documentation on behalf of the City of Noblesville.

The purpose of this Alternatives Screening Memo is to present the Project's range of alternatives to be considered, referred to as corridors at this stage, discuss the results from the screening analysis, and identify the corridor recommended to be carried forward as the Preferred Alternative (see attached maps).

Previous studies

All corridors under consideration for the proposed project would begin at S.R. 37 and extend to the west, traveling over the White River and terminating at S.R. 32. This corridor has been the subject of study since the 1995 Noblesville Comprehensive Plan and Thoroughfare Plan. In 1999 Hamilton County studied various White River Bridge crossings. In 2008, an analysis of a Pleasant Street Bridge was conducted and in 2015 a feasibility study of the Pleasant Street Corridor was conducted (available upon request). In addition to these studies, consideration of the Metropolitan Planning Organization (MPO) Travel Demand Modeling, Traffic Impact Studies, historic traffic data, and other facility improvements have been undertaken by the city and the county. The city also considered input informally provided by the Southwest Quad Neighborhood Action Team.

East-west corridors considered to date include (*shown to the right in red, blue, green, and yellow*): 191st Street, 186th Street (Field Drive), Pleasant Street, Carbon Street, Irving Street, and 161st Street. Additional alternative corridors considered previously included: Cherry Street, Logan Street, Maple Street, Hannibal Street, and



See appendix for full resolution map

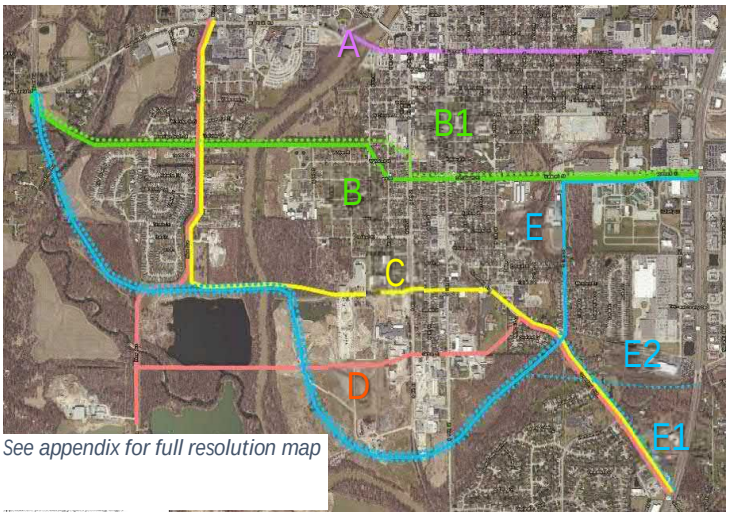
Division Street. Of the alternative corridors considered, the 186th Street/Field Drive extension and crossing was completed in 2003 and connects S.R. 37 in the east to S.R. 19 west of the White River. The 191st Street corridor was determined to have limited effect on traffic patterns within Noblesville and was not considered further. Due to constructability concerns with local gravel quarries and the limitation in connecting to S.R. 37, the 161st Street corridor was not considered further. Due to limitations in connecting east to S.R. 37 or in crossing west over the White River, Logan Street, Maple Street, Cherry Street, Division Street, and Hannibal Street were also eliminated from further consideration. The city determined that the following alternative corridors would move forward for further consideration; Conner Street, Pleasant Street, Irving Street, and Carbon Street.

More recently, alternative corridors were suggested by the Southwest (SW) Quad Action Team, a group representing the Noblesville Southwest Quad neighborhood. These corridors were added to the alternatives (Alternatives E, E1, and E2) under consideration and can be found described in greater detail below.

The east-west corridor project will meet S.R. 37 at-grade and is not associated with the S.R. 37 Improvement Project, as outlined in the SR 37 Mobility Study, led by Hamilton County and presented to the Indiana Department of Transportation (INDOT), Hamilton County, City of Fishers, and City of Noblesville. The S.R. 37 and Greenfield Avenue, Town and Country Boulevard, Pleasant Street, Cherry Street, and S.R. 32/S.R. 38 intersections were included in that study. Environmental impacts associated with the placement of an interchange at these locations have been documented under separate environmental planning documentation prepared for the S.R. 37 Improvement Project. The City of Noblesville is now considering the scope of the design for these intersections, which will be conducted separate from this project.

Considered Alternatives

The alternatives considered for the proposed project (shown below) can be found in full detail in Appendix B of this document. Each corridor is considered conceptual and alignments are presented for the purposes of preliminary impact comparison.



See appendix for full resolution map

Corridor A – Conner Street

Corridor A would begin near the intersection of S.R. 37 and S.R. 32/Conner Street and would continue through to State Road 19, over the existing White River Bridge. This corridor would travel through downtown and two National Register listed districts, the Conner Street Historic District and Noblesville Commercial Historic District (see attached Historic Resources Map).

Corridor B – Pleasant Street

Corridor B would begin near the intersection of S.R. 37 and Pleasant Street. From the 10th Street and Pleasant Street intersection, the route would curve north to meet the former east-west Midland Trace railroad bed that crosses the White River between Vine Street and Mulberry Street at 5th Street. Before crossing west over the White River, this corridor traverses the National Register listed Plum Prairie Residential Historic District (see attached Historic Resources Map). Corridor B would then continue west of the White River on the same railroad bed, until crossing Little Cicero Creek, where it would veer northwest to meet S.R. 32 and Hague Road.

Corridor B1 – Pleasant Street

Corridor B1 would also begin near the intersection of SR 37 and Pleasant Street. The route would also follow Pleasant Street and curve north to meet the former east-west Midland Trace railroad bed. However, this corridor would attempt to travel around the National Register listed Plum Prairie Residential Historic District (see attached Historic Resources Map). Corridor B1 would then continue on the same path across White River as Corridor B, joining with SR 32 and Hague Road.

Corridor C – Irving Street

Corridor C would begin at the intersection of S.R. 37 and Greenfield Avenue and would continue along Greenfield Avenue, before veering west near Holland Street and Stony Creek Elementary School. This portion of the corridor would cross Stony Creek. Corridor C would travel west through existing commercial/industrial development to meet with the remnants of Irving Street, before crossing the White River. This industrial and commercial area is documented with multiple hazardous materials sites and landfills (see attached Hazardous Material Concerns Map). The corridor would then continue west of the White River to meet with River Road and follow it north to S.R. 32.

Corridor D – Carbon Street

Corridor D would begin at the intersection of S.R. 37 and Greenfield Avenue, sharing the same course as corridor C, though veering west near Overland Court. This portion of the corridor would also cross Stony Creek. Corridor D would then travel southwest through residential development, to meet the existing alignment of Carbon Street. From Carbon Street, the corridor would continue through an industrial and commercial area documented with multiple hazardous materials sites and landfills (see attached Hazardous Material Concerns Map). The corridor would continue west over the White River and between existing quarry pits and Little Cicero Creek, before eventually meeting with River Road. The corridor would then follow River Road north to S.R. 32.

Corridor E – SW Quad, 16th Street

As proposed by representatives of the SW Quad Action Team, Corridor E would begin at the intersection of S.R. 37 and Pleasant Street, follow 16th Street south to Stony Creek Road and Greenfield Avenue, crossing Stony Creek and heading southwest to 10th Street/Allisonville Road. Corridor E would then travel west and follow the eastern side of White River to cross the White River at the same location as Corridors C and D. Corridor E would follow the same path as Corridors C and D and diverge at River Road, crossing Cicero Creek, before continuing northwest to meet S.R. 32 and Hague Road.

Corridor E1 – SW Quad, Greenfield Avenue

Alternatively proposed by representatives of the SW Quad Action Team, Corridor E1 would begin at the intersection of S.R. 37 and Greenfield Avenue, would continue northwest along Greenfield Avenue and continue southwest at the intersection with 16th Street. Corridor E1 would then travel across 10th Street and loop north along the east bank of the White River, where it would meet the alignments of Corridors C, D, and E, to cross the White River. Corridor E1 would then follow the same alignment as E to meet up with S.R. 32 and Hague Road.

Corridor E2 – SW Quad, 166th Street/New Terrain

Alternatively proposed by representatives of the SW Quad Action Team, Corridor E2 would begin at the intersection of S.R. 37 and the approximate location of 166th Street, would then continue west along the general path of Stony Creek, until reaching a shared alignment with E. Corridor E2 would continue west following the same alignment as E, past 10th Street and across the White River at the same location as Corridors C, D, E, and E1. E2 would also meet with S.R. 32 and Hague Road at the same location as E and E1.

Screening Approach

To ensure a full range of reasonable alternatives were considered, the screening process was developed to evaluate the full suite of impacts for each alternative equally. Since the alternatives were established at a conceptual level, general alignments were drawn based on remotely gathered information (mapped features that have not necessarily been confirmed on the ground) available at the time. For the sake of equal comparison amongst alternatives, all corridors were considered to have a 120-foot-wide conceptual right-of-way impact. The conceptual cross-section included up to four 11-foot travel lanes, with a 12-foot median, curb, and gutter, as well as pedestrian facilities, which would resemble a boulevard style roadway. This would not represent the final alignment, right-of-way width, cross-section width, number of lanes, etc. for the roadway. The outcome of this alternatives screening will assist in determining the Preferred Alternative.

In addition to environmental features, evaluation criteria included construction costs, engineering feasibility, constructability (or the level of construction complexity), and conceptual level right-of-way relocation determinations. Environmental features were each considered by the level of impact to the resource, generally in acreage disturbance for the natural environment and number of impacts for the human environment. The features considered in this screening are discussed

in greater detail below. Ultimately, the screening process was used to identify the reasonable alternative that satisfied the Project's purpose and need, while also presenting the least environmentally impactful alternative.

Purpose and Need

The City of Noblesville has seen tremendous growth, both residential and commercial, over the past three decades and is the 14th largest community in Indiana (based on 2010 data). U.S. Census data reports that Noblesville had an approximate population of 12,250 in 1980, 17,650 in 1990, 51,970 in 2010, and 63,133 in 2018.

Noblesville East-West Corridor Project - Des. No. tbd
Alternatives Screening Matrix
estimated within 120 foot wide corridor, 60 feet either side

Criteria	Alternatives								
	No Build	A Conner St.	B Pleasant St.	B (1) Pleasant St.	C Irving St.	D Carbon St.	E 16th St.	E (1) Greenfield Ave.	E (2) 166th St.
PURPOSE AND NEED CONSIDERATIONS									
Does alternative significantly reduce the volume of traffic along the SR 32/SR 38 corridor through downtown?	NO (+30%)	NO (0%)	YES (-24%)	YES (-24%)	NO (-10%)	NO (-8%)	NO (-10%)	NO (-10%)	NO (-10%)

There are currently only two White River crossings in downtown Noblesville, one at S.R. 32/Conner Street and the other at Logan Street. The S.R. 32/Conner Street river crossing provides two through lanes in each direction and the Logan Street river crossing provides one through lane in each direction. This limits the mobility within the Noblesville transportation network. This also increases congestion within the S.R. 32/Conner Street corridor through downtown Noblesville. The existing volume of Average Daily Traffic (ADT) along S.R. 32/Conner Street is 15,000 vehicles per day and is anticipated to increase to as much as 19,000 vehicles per day in the design year 2045.

The project is needed due to limited mobility through downtown Noblesville on S.R. 32/Conner Street, as outlined in the 2009 Noblesville Thoroughfare Plan and evidenced by increasing traffic volumes. The purpose of the project is to provide a significant volume reduction of S.R. 32 downtown Noblesville traffic, defined as 20% reduction. A 20% reduction in traffic volume results in 2045 traffic volumes on S.R. 32/Conner Street that are no greater than existing (year 2025) traffic volumes.

The "No Build" alternative would utilize the existing road network and would not include the expenditure of capital funds or improvements. This would not address the purpose of the project, which is to provide a significant traffic volume reduction (20% or greater) in downtown Noblesville. Additionally, Conner Street (Alternative A) conceptual design would not provide a significant reduction in downtown traffic volume. The Conner Street Alternative did not meet the project purpose and need and therefore was not considered further. Although the "No Build" Alternative did not meet the project purpose and need, the alternative will act as a benchmark to compare the preferred alternative, going forward.

Evaluation of Impacts

The evaluation described in this memo is made possible by utilizing the most recent geographic information systems (GIS) data available from the Indiana Geographic Information Office (GIO), Indiana Geographic Information Council (IGIC), IndianaMap, Hamilton County GIS, and the City of Noblesville GIS. GIS is a collection of electronic tools used to build and maintain electronic maps and the associated databases of information tied to those maps. The GIS data obtained for this screening provided an equal consideration of environmental impacts across the alternative corridors considered. All GIS data collected at the time of this memo was considered to be complete and to be the best available data at that time. This data is made publicly available and can be obtained from the Indiana GIO, IndianaMap, or local GIS offices in Hamilton County or Noblesville.

The GIS information provided a representative overview of impacts to resources within the considered corridors. An overview of the impacts is provided below in the Summary of Potential Impacts, which highlights the resource impacts deemed to have the most potential for determining the least environmentally impactful alternative and thus choosing the Preferred Alternative. The full Alternatives Screening Matrix can be found in Appendix A of this document.

Summary of Potential Impacts

Ecology

Waterways

A review of the United States Geological Society (USGS) National Hydrography Dataset (NHD) provided estimates of impacts to waterways. The White River, Cicero Creek, Stony Creek, Elwood-Wilson Drain and a few unnamed tributaries were identified within the path of the proposed alternatives, generally flowing from north to south. Stony Creek and tributaries enter the review area from the east-northeast and flow to the White River south of the E Alternatives. Cicero Creek and tributaries flow south to join the White River south of the D Alternative. Elwood-Wilson Drain flows south from the general vicinity of the old Firestone facility, north of the B Alternatives. The White River flows from north to south through Noblesville and would be impacted by any of the alternatives considered. Cicero Creek would be impacted by the B and E Alternatives, and Stony Creek would be impacted by the C, D, and E Alternatives. A few alternatives considered would impact multiple waterways or a single waterway in multiple locations. The E Alternatives would

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estimated within 120 foot wide corridor, 60 feet either side

Criteria	Alternatives								
	No Build	A Conner St.	B Pleasant St.	B (1) Pleasant St.	C Irving St.	D Carbon St.	E 16th St.	E (1) Greenfield Ave.	E (2) 166th St.
ENVIRONMENTAL CONSIDERATIONS									
Forest Impacts (net loss in acres)			12	13	8	12	24	25	27
Mineral/Geological Resource Impacts (total acres)			0	0	6	11	11	11	11
Potential Hazardous Material Sites			1	1	5	9	4	6	4
Waterway Crossings			3	3	3	5	5	5	6
Open Water Resources Impacted			0	0	0	1	2	2	2
Floodplains (total acres)			7	7	8	18	29	29	35
Wetland (NWI) Impacts (total acres)			0.4	0.4	1.5	5	6	6	10

impact Cicero Creek and an UNT, whereas; E and E 1 would impact Stony Creek in two locations as well, E2 would impact Stony Creek in three locations. Alternative D would impact Stony Creek in two locations, as well as Cicero Creek in two locations. The B Alternatives would impact Elwood-Wilson Drain in one location and Cicero Creek in one location. Alternative A would impact only the White River.

Open Water

The USGS NHD was also used to provide estimates of impacts to open water, though aerial imagery supplemented this review. The NHD for open water was noted to conflict with recent (2018) aerial imagery and in those cases, imagery was considered the most current data. Previous quarries, now ponds, occupy the White River floodplain, south of the C Alternative. Additionally, small storm water detention basins were identified throughout Noblesville. Alternatives C and D would have an edge impact on the open water quarries located adjacent to the White River between the alternatives. The B Alternatives would impact a small detention pond near the Hamilton County Fairgrounds. The E Alternatives would impact an open water pond near SR 32 and Hague Road, as well as an open watery quarry between Alternatives C and D, east of the White River.

Floodplains

The Indiana Department of Natural Resources (DNR) digital Flood Rate Insurance Maps (FIRM) and Flood Hazard Zones were used to provide impact estimates to floodplains. Floodplain impacts are encountered by all of the alternatives considered. As with the White River, its floodplain is impacted by all of the alternatives considered. The floodplains of the remaining waterways are impacted in proportion to the waterway impacts listed above, with a few notable deviations. Alternatives A, B, B1, C and D impact the floodplains by crossing or transecting them. Of those that transect the floodplain, the B Alternatives impact the floodplain the least by utilizing the existing railroad bed from the former Midland-Trace railroad, which is situated above the regulatory flood elevation of the White River. The E Alternatives propose impacting the floodplain of Cicero Creek, the White River, and particularly Stony Creek (through the E2 Alternative) by longitudinal or lengthwise impact. The impacts considered here are for physical occupation of the floodplain (in acreage), however, hydraulic impacts from longitudinal impacts in a floodplain typically amplify the impact, as flood storage and conveyance is reduced or eliminated entirely. Accounting for indirect impact to floodplains requires extensive hydraulic modeling and is not prudent for comparison of all alternatives. Hydraulic engineering is required for the Preferred Alternative to obtain the necessary permits from the Indiana DNR Division of Water.

Forests

The 2017 Hamilton County aerial imagery was used to provide impact estimates to forests, which were defined as contiguous wooded area. All alternatives considered were determined to impact forests, much of which are located in the undeveloped floodplain. The greatest forest impacts were determined to be caused by the E Alternatives, which rely on development of forested floodplain for each general alignment. The A, B, B1, and C Alternatives impacts result from narrow riparian forest crossings over the White River. Alternative A would require the least forest impact, due to the greater degree of development along the corridor. The B Alternatives primarily impact

a thin, linear forest that now occupies the former Midland-Trace railroad bed. Multiple crossings over the forested floodplain of the White River and Cicero Creek account for forest impacts for Alternative D. The C, D, and E Alternatives impact forests by bisecting larger, contiguous forests.

Wetlands

The U.S. Fish and Wildlife Service (USFWS) Nationwide Wetland Inventory (NWI) map was used to determine the impacts of the alternatives on wetlands. The methodology for mapping the NWI allows for a relative comparison of the alternatives, however, further field investigation will be conducted for the route of the Preferred Alternative to verify features on the ground. The majority of the wetlands identified were the palustrine forested category of wetland commonly associated with riparian and floodplain areas. A few lacustrine wetlands were mapped where open water features and/or quarries exist. Wetlands are encountered by all of the alternatives considered, though impacts from the A and B Alternatives are substantially lower, due to the greater degree of development present along these corridors. Although Alternative D is transecting the floodplain, the impacts are substantial, due to the width of the floodplain at the confluence of Cicero Creek and the White River. Impacts are greatest from the E Alternatives, in particular the E2 Alternative, which follows undeveloped floodplain property for the majority of its path.

Mineral and Geological Resources

Data accessed from the IndianaMap regarding geological resources, mining and mineral sites, and petroleum wells past and present were used to determine impacts to geologic resources. In particular, the A and B Alternatives do not include impacts to these resources. Impacts to geological and mineral resources are most pronounced in the southern alternatives (C, D, E, E1, and E2). Due to the history of sand/gravel mining in the White River floodplain in this southern region of the City, additional engineering feasibility assessments would be required to provide specific impact evaluation. Impacts are considered on the number of known features encountered.

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Alternatives Screening Matrix
estimated within 120 foot wide corridor, 60 feet either side

Criteria	Alternatives								
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ENVIRONMENTAL CONSIDERATIONS									
Mineral/Geological Resource Impacts (total acres)			0	0	6	11	11	11	11
Potential Hazardous Material Sites			1	1	5	9	4	6	4

Hazardous Materials/ Site Assessment

Hazardous Materials and Industrial Site regulatory records were queried through the GIS database provided by the Indiana GIO. During agency coordination, the Hamilton County Surveyor made the project team aware of the mapped records of landfills in the investigation area of the alternative corridors. Records in the GIS were then researched in the Indiana Department of Environmental Management (IDEM) Virtual File Cabinet (VFC) to determine whether each facility/site/property presented a “red flag” for the alternative corridors considered. These

records represent regulatory records, known releases of contaminates, document a legacy use of regulated chemicals/materials, and provide context to whether a site may require additional environmental investigation. The data used in this portion of the screening is limited to the records available at the time of the screen. Unknown hazardous sites or sites with unknown release of contaminates are not considered.

Records in the IDEM VFC reflect the industrial legacy of the 8th and 10th Street corridor, as well as the Firestone Industrial Products Company facility on Pleasant Street. Contaminate release on Pleasant Street is well studied, remediation has been conducted, and impacts are well known and low. Alternative C encounters the Indiana Ductile castings facility on the northern property boundary. Investigation of VFC records indicate that the site has a legacy of volatile organic compounds ("VOCs"), polycyclic aromatic hydrocarbons ("PAHs"), and metals. Further information can be found in the Environmental Restrictive Covenant (ERC) recorded on the property on June 12th, 2015. According to VFC records, there is also a private landfill on site on the western boundary of the property. Alternative D would also potentially encounter this site, as well as encounter two historic landfills, Staton Landfill and Noblesville Castings, on the eastern bank of the White River. The E Alternatives would require construction of their shared alignment within the boundary of the Staton Landfill. Hazardous Materials concerns in these southern corridor alternatives would require special design considerations to ensure a stable roadbed, as well as exposure precautions for construction worker safety during excavation and construction within these sites.

Historic Resources (above and below-ground)

For the purposes of the state environmental planning process, only those above-ground and below-ground historic resources listed on the National Register of Historic Places (NRHP or National Register) were considered. This information was provided by a Qualified Professional Historian, using the Indiana Historic Buildings, Bridges, and Cemeteries Map and State Historic Architectural and Archaeological Research Database (SHAARD), provided by the IDNR, Department of Historic Preservation and Archaeology (DHPA). Only above ground resources are made publicly available in the SHAARD GIS, per state law. These features were determined through an informal assessment of previously identified resources in or adjacent to the considered alternatives. These results are preliminary for the purposes of relative comparison of the considered alternatives. A ground survey will be conducted to confirm these findings during the development of the Preferred Alternative.

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	No Build	A Conner St.	B Pleasant St.	B (1) Pleasant St.	C Irving St.	D Carbon St.	E 16th St.	E (1) Greenfield Ave.	E (2) 166th St.
ENVIRONMENTAL CONSIDERATIONS									
Listed Historic Properties/Districts Affected			1	0	0	0	0	0	0
Listed Archaeological Sites Affected			0	0	0	0	0	0	0
ENGINEERING CONSIDERATIONS									

These preliminary findings did not identify listed historic resources (below or above-ground) for the southern alternatives, including the C, D, and E Alternatives. Alternative A would affect the

Conner Street Historic District and the Noblesville Commercial Historic District. Alternative B would affect the Plum Prairie Residential Historic District. Alternative B1 was developed in an effort to minimize or avoid effect to the Plum Prairie Residential Historic District.

Community Impacts

Property Acquisition/Relocations

For the preliminary purposes of alternatives screening, land parcel data available on IndianaMap was examined in context of the conceptual alternatives alignments to determine potential residential and/or business relocations required. Individual level property acquisition estimates were not made. The results from this analysis follow the general divide between alternatives considered within existing development and those considered outside of development. The total estimated number of relocations required for the B Alternatives was higher than those of

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ENVIRONMENTAL CONSIDERATIONS									
Right-of-Way (combined acres)			29	30	26	34	47	43	45
Business Relocations			8	8	7	8	5	0	0
Homes/Apartment Unit Relocations			68	46	20	21	30	5	2
Enviromental Justice Populations			2	2	3	3	3	3	3

Alternative C or D. The E1 and E2 Alternatives had the least anticipated relocation impacts. In an effort to avoid or minimize impacts to the Plum Prairie residential neighborhood (also known as Southwest Quad), the B1 Alternative reduced anticipated relocation impacts. Anticipated business relocation impacts for the B, C, and D Alternatives were similar, while E1 and E2 did not result in any anticipated impacts.

Environmental Justice

American Community Survey data for the year 2017 was examined for demographic insight regarding minority or low-income populations within the City of Noblesville. These Environmental Justice (EJ) populations are identified based on their relative representation within the overall reference community (Community of Comparison). An EJ population of concern exists if it comprises more than 50% of the Affected Community (AC) population or 125% of the COC.

Five Affected Communities (AC) were identified as Environmental Justice populations of concern (Census Tracts 1105.06, 1105.08, 1105.09, 1106, and 1107). Together these tracts encompass the entire area considered for the East-West corridor and some portion of the corridor for each alternative exists within one or more of these Affected Communities. Therefore, impacts to an EJ population from the project were considered comparable across all alternatives. Efforts have been made to ensure full and fair involvement from these communities, which will continue through the selection of the Preferred Alternative.

Engineering Considerations

Where statewide geographic data was not available, such as in the case of engineering feasibility, constructability, and cost, American Structurepoint, Inc. provided conceptual evaluations of the alternative corridors. Corridor cost was determined using estimate of cost for major elements of construction, such as earthwork, pavement, bridges, or other structures. All items were equally considered in context of the 120-foot-wide conceptual corridor noted above in Screening Approach. Each corridor was considered to be likely feasible to engineer, though consideration of constructability (or construction complexity) varied widely. Constructability incorporates the ease and efficiency with which a facility is built, taking into account the economics, schedule and budget of a project. To account for uncertainties in design, constructability was expressed conceptually as low, medium, or high.

A number of uncertainties exist in this high-level engineering consideration of conceptual corridors, though all corridors were considered equally across the same major elements. Further geotechnical analysis of the underground condition or hydraulic modeling for flood water storage and conveyance would be necessary to provide additional detail to these considerations.

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Alternatives Screening Matrix
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ENVIRONMENTAL CONSIDERATIONS									
Mineral/Geological Resource Impacts (total acres)			0	0	6	11	11	11	11
Potential Hazardous Material Sites			1	1	5	9	4	6	4
Wellhead Protection Areas/Wells Affected			0	0	3	1	6	6	6
ENGINEERING CONSIDERATIONS									
Constructability (High, Medium or Low)			High	High	Medium	Low	Low	Low	Low
Estimated Construction Cost (2023) (Million $)			58	59	66	97	102	97	141
Length (total miles)			2.48	2.53	2.88	3.69	3.93	3.47	3.27
New Alignment (total miles)			1.45	1.42	1.10	1.28	2.93	2.89	3.27
Traffic congestion change (+/-) along SR 32/38 downtown			-24%	-24%	-10%	-8%	-10%	-10%	-10%

Constructability is highest (least complex) for the B Alternatives and lowest (most complex) for the E Alternatives. Given the complexity of construction for the E Alternatives, they were also determined to be the costliest. Given the length of the D and E Alternatives within the floodplain, these alternatives were noted as needing additional or complex hydraulic modeling to ensure that indirect flooding would not result from constructing these alternatives. The need for additional geotechnical study was also noted for the C, D, and E alternatives, given the history of sand/gravel mining, presence of active quarries, noted hazardous materials sites, and historic landfills. Additionally, existing and planned wellheads in or adjacent to the C, D, and E Alternatives were considered as utility conflicts that would require careful coordination. Therefore, the B Alternatives were determined to be the least costly and most feasible in terms of engineering effort.

Traffic analysis was also conducted to compare the change in traffic volumes on SR 32/ Conner Street through downtown Noblesville, due to the construction of each alternative corridor. The baseline for traffic volume levels were established by the existing collected downtown traffic

volumes on SR 32/Conner Street. Each alternative was input into the traffic modeling software and the resulting change in downtown volumes were noted. These figures are expressed in the screening matrix as a percentage change for comparison. The purpose of this project is to provide a significant reduction of traffic volumes, defined as 20% or greater, which was only met by the B Alternatives.

Agency Input

State, federal, and local agencies were contacted during the early coordination stage of project development on April 20, 2020, followed by an agency meeting on May 21, 2020. The agencies were provided project history, the project purpose and need, the eight currently considered alternatives, as well as an initial Alternatives Screening Matrix and maps of the resources featured in the matrix. Of the 23 agencies contacted, 11 responded to early coordination. Agency feedback was generally neutral and there were no specific objections to the alternatives presented.

The Natural Resources Conservation Service (NRCS) responded that the B and E Alternatives would cause a conversion of prime farmland. The USFWS responded generally that the limited forest and wetland resources of Hamilton County would be further degraded or fragmented by an alternative utilizing new roadway. Therefore, the USFWS generally recommended that the Preferred Alternative should have the fewest impacts by avoiding disturbing or bisecting these resources. The IDNR, Division of Fish and Wildlife responded during the agency meeting and again formally in response to early coordination that the B1 Alternative was the least environmentally impactful and therefore their recommended alternative.

Community Feedback

The community was provided opportunity to view the considered alternatives and provide feedback through the Community Advisory Committee (CAC) meeting held on July 15, 2020 and the Public Information Meeting held on July 29, 2020. The public has been afforded the opportunity to provide comment, beginning with the July 15, 2020 CAC meeting through August 12, 2020, two weeks after the Public Information Meeting. One additional public comment was received September 4, 2020. There were 14 attendees at the Public Information Meeting and 17 members (and 5 observers) attended the Community Advisory Committee Meeting. Three additional requests for project information were received in response to the Public Information Meeting and those individuals received the same information handouts as attendees.

Based on formal responses from the CAC and public meeting, the community generally agrees with the project need, which is unacceptable congestion caused by high traffic volumes experienced on SR 32/Conner Street corridor in downtown Noblesville. These traffic volumes are particularly pronounced during morning and evening rush hour. However, the responses from the community differed based on the perception of the source of the high traffic volumes. Many supported an additional east-west corridor situated within proximity to downtown, which would be available for the high volumes of primarily local traffic within the Noblesville Community. Others envisioned the construction of a bypass to shift the high traffic volumes, perceived as primarily commuter and non-local traffic, to the south away from downtown.

Three CAC members, a Southwest Quad resident, a Dove's Court property owner, and the Chamber of Commerce, expressed their support for the B1 Alternative, as Pleasant Street has been discussed locally for many years, addresses the project need, provides the greatest benefit to traffic operations within the City, and maintains connection with downtown businesses. Two CAC members, the Southwest Quad Action Team and the Noblesville Preservation Alliance, expressed their support for the D or E Alternatives (or a hybrid thereof). These groups expressed concern with the effect an east-west arterial roadway would have on Southwest Quad Neighborhood cohesion and expressed opposition to relocations and existing neighborhood impacts.

There were four formal comments received from the community during the two-week comment period that followed the July 29, 2020 Public Information Meeting. Respondents expressed concern with character of the proposed traffic (speed, amount, volume, type, and associated safety), indirect neighborhood impacts, and associated residential right-of-way acquisitions and/or relocations. Others expressed concern with traffic engineering model, the origin of the traffic currently causing the congestion, and suggested alternative travel corridors that would not meet this project's purpose. These respondents expressed support of the C, D, and/or E Alternatives. One additional response was received after the official comment period outlining concerns with the depressed condition of the neighborhood, questioning the process for listing the neighborhood as historic, and supporting the B Alternative as an opportunity to improve the Southwest Quad neighborhood, while maintaining connection to downtown.

Neighborhood impacts and impacts from the acquisition of right-of-way are similar across the considered alternatives, as the same conceptual cross-section and 120-foot-wide corridor were used for all alternatives compared. The speed, volume, type, and safety of traffic for any one of the alternatives would be that of a local arterial roadway. The maximum conceptual cross-section included up to four 11-foot travel lanes, with a 12-foot median, curb, and gutter, as well as pedestrian facilities, which would resemble a boulevard style roadway. The specific elements of the roadway will be designed for the Preferred Alternative. These elements will be determined based on engineering, traffic, safety, and community input on local context sensitive solutions to ensure the project meets the purpose and need, while fitting into the context of the surrounding community.

The traffic model completed for this project utilized traffic volume counts and anonymized Bluetooth data to determine origin-destination information within the project study area. The traffic model was developed and certified by a professional engineer with training and experience in the field of traffic and transportation engineering and is consistent with industry standards for this type of analysis. Though some portion of the congestion experienced on SR 32/Conner Street is due to non-local or thru traffic, a full regional scale study would be required to extract this level of detail. A full regional traffic model is not prudent in addressing the project need, which is high traffic volumes in downtown Noblesville. Though a bypass would provide an alternative east-west corridor, it would not provide a significant reduction of downtown Conner Street traffic volumes. Traffic modeling demonstrates that the ability to reduce traffic volumes along SR 32/Conner Street diminishes as a corridor is placed further away from downtown. This rationale was discussed at the Community Advisory Committee meeting and shared with attendees of the Public Information Meeting.

Selection of Preferred Alternative

The screening of alternatives for impacts to the human and natural environment did not result in an alternative with the fewest impacts across every category of impact. The impacts encountered by the alternatives generally split between corridors considered in existing development, which minimize natural environment impacts, and undeveloped floodplain to the south, which minimize impacts to the human environment. Impacts to the natural environment to the south also coincided with engineering challenges regarding hydraulic and geotechnical feasibility of design and construction and whether extensive costs were a prudent use of funds.

Early consideration of congestion reduction from potential Alternative A designs resulted in no appreciable change in traffic volumes. This alternative would not meet the project purpose and environmental impacts were not considered further. Environmental impacts from the C, D, and E Alternatives were greater than those of the B Alternatives, with the E Alternatives having the greatest impact. The B alternatives resulted in the least overall impact. This is attributed to the use of existing alignment, particularly the use of the former Midland-Trace railroad bed.

The C, D, and E Alternatives did provide congestion relief; however, they did not meet the project purpose of providing a significant reduction in traffic volumes, defined as 20%. A 20% reduction in traffic volume results in 2045 traffic volumes on S.R. 32/Conner Street that are no greater than existing (year 2025) traffic volumes. This was determined to be the most prudent metric for assessing whether an alternative could accomplish significant traffic reduction.

On the whole, the B Alternatives best satisfied the project purpose, by providing a significant congestion reduction. The B Alternatives also utilized existing development to minimize environmental impacts and avoid complex and costly engineering and construction. The B1 Alternative provided further reduction of impacts by minimizing effect on the Plum Prairie Residential Historic District, therefore, it is recommended as the Preferred Alternative.

Attachments

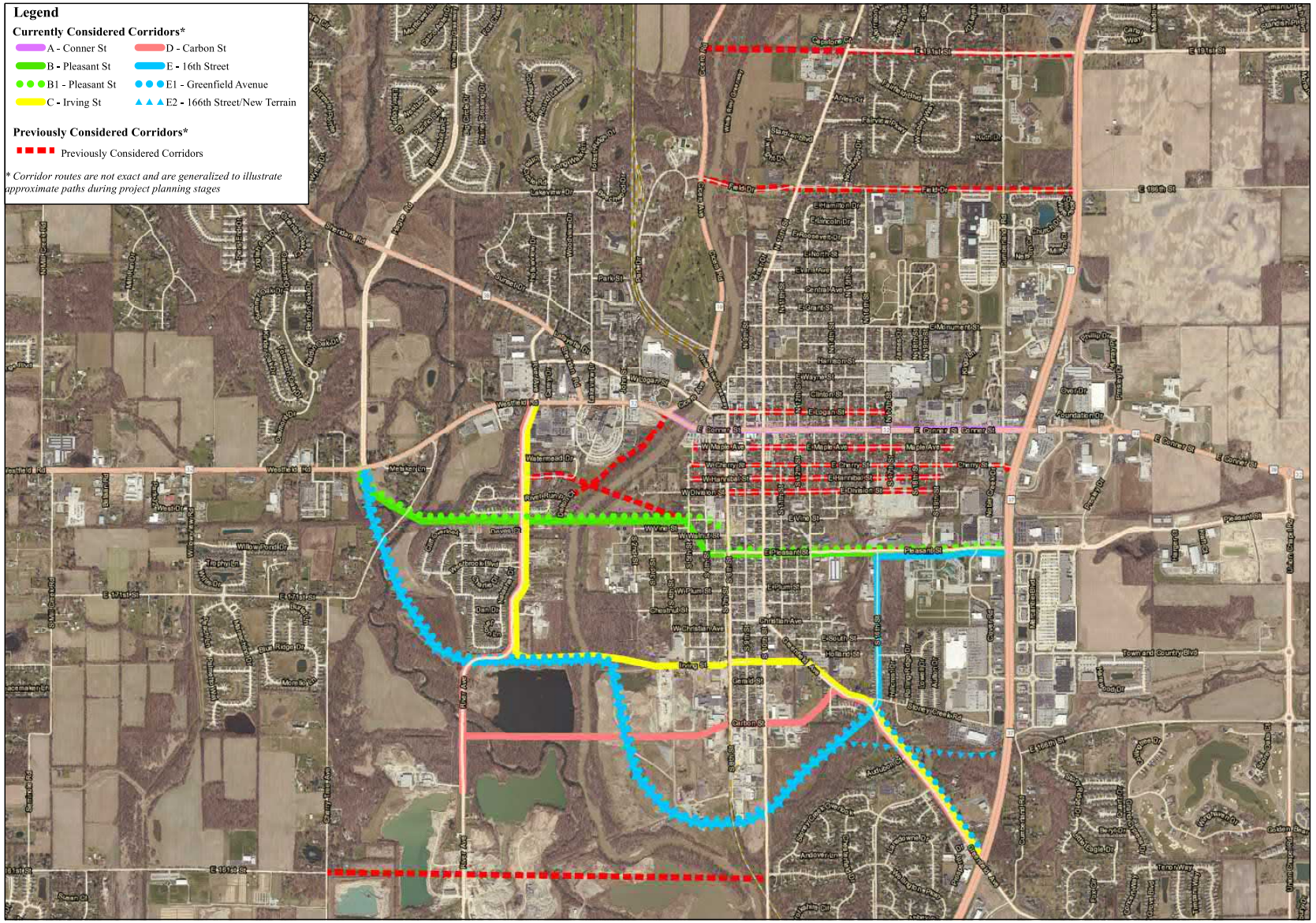
A. Alternatives Screening Matrix
B. Alternatives Impact Mapping

Noblesville East-West Corridor Project - Des. No. tbd

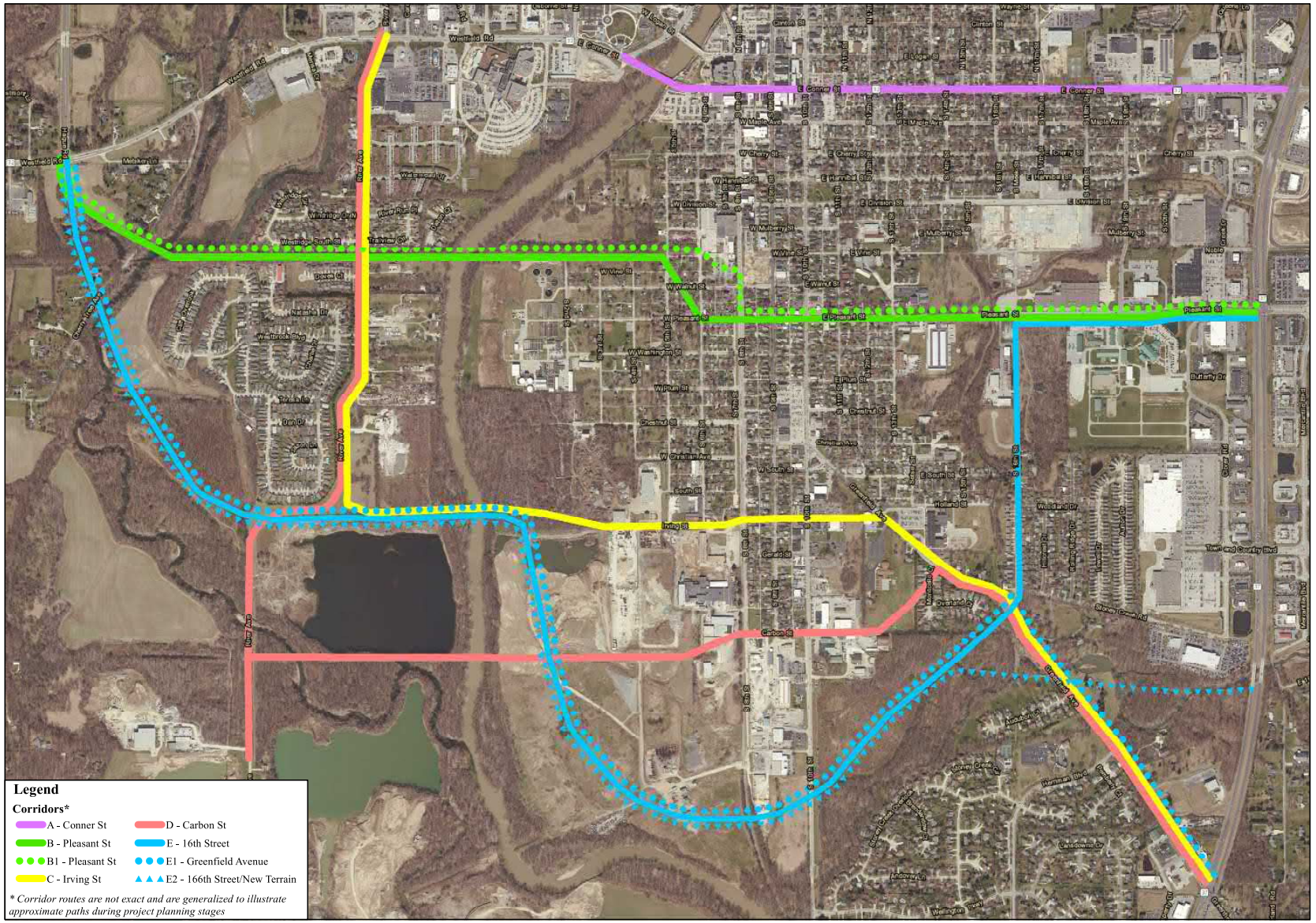
Alternatives Screening Matrix

estimated within 120 foot wide corridor, 60 feet either side

Criteria	Alternatives								
	No Build	A Conner St.	B Pleasant St.	B (1) Pleasant St.	C Irving St.	D Carbon St.	E 16th St.	E (1) Greenfield Ave.	E (2) 166th St.
PURPOSE AND NEED CONSIDERATIONS									
Does alternative significantly reduce the volume of traffic along the SR 32/Conner Street corridor through downtown?	**NO (+30%)**	**NO (0%)**	YES (-24%)	YES (-24%)	NO (-10%)	NO (-8%)	NO (-10%)	NO (-10%)	NO (-10%)
ENVIRONMENTAL CONSIDERATIONS									
Right-of-Way (combined acres)			29	30	26	34	47	43	45
Business Relocations			8	8	7	8	5	0	0
Homes/Apartment Unit Relocations			68	46	20	21	30	5	2
Farmland Impacted (total acres)			2	2	0	0	1	1	1
Prime Farmland (total acres)			2	2	0	0	1	1	1
Forest Impacts (net loss in acres)			12	13	8	12	24	25	27
Mineral/Geological Resource Impacts (total acres)			0	0	6	11	11	11	11
Potential Hazardous Material Sites			1	1	5	9	4	6	4
Waterway Crossings			3	3	3	5	5	5	6
Open Water Resources Impacted			0	0	0	1	2	2	2
Floodplains (total acres)			7	7	8	18	29	29	35
Wetland (NWI) Impacts (total acres)			0.4	0.4	1.5	5	6	6	10
Listed Historic Properties/Districts Affected			1	0	0	0	0	0	0
Listed Archaeological Sites Affected			0	0	0	0	0	0	0
Enviromental Justice Populations			2	2	3	3	3	3	3
Wellhead Protection Areas/Wells Affected			0	0	3	1	6	6	6
ENGINEERING CONSIDERATIONS									
Constructability (High, Medium or Low)			High	High	Medium	Low	Low	Low	Low
Estimated Construction Cost (2023) (Million $)			58	59	66	97	102	97	141
Length (total miles)			2.48	2.53	2.88	3.69	3.93	3.47	3.27
New Alignment (total miles)			1.45	1.42	1.10	1.28	2.93	2.89	3.27
Traffic volume change (+/-) along SR 32/Conner Street downtown			-24%	-24%	-10%	-8%	-10%	-10%	-10%


Legend
Currently Considered Corridors*
A - Conner St
B - Pleasant St
B1 - Pleasant St
C - Irving St
D - Carbon St
E - 16th Street
E1 - Greenfield Avenue
E2 - 166th Street/New Terrain
Previously Considered Corridors*
Previously Considered Corridors
* Corridor routes are not exact and are generalized to illustrate approximate paths during project planning stages
CHA
design/construction solutions
Considered Corridors Map
East-West Corridor Project
Noblesville, Hamilton County, Indiana
Scale 1" = 900'
CHA Project No 59473
DES No TBD
Image Courtesy of the IndianaMap
Photo Date: 2017

B-1



CHA design/construction solutions

Aerial Location Map

East-West Corridor Project
Noblesville, Hamilton County, Indiana

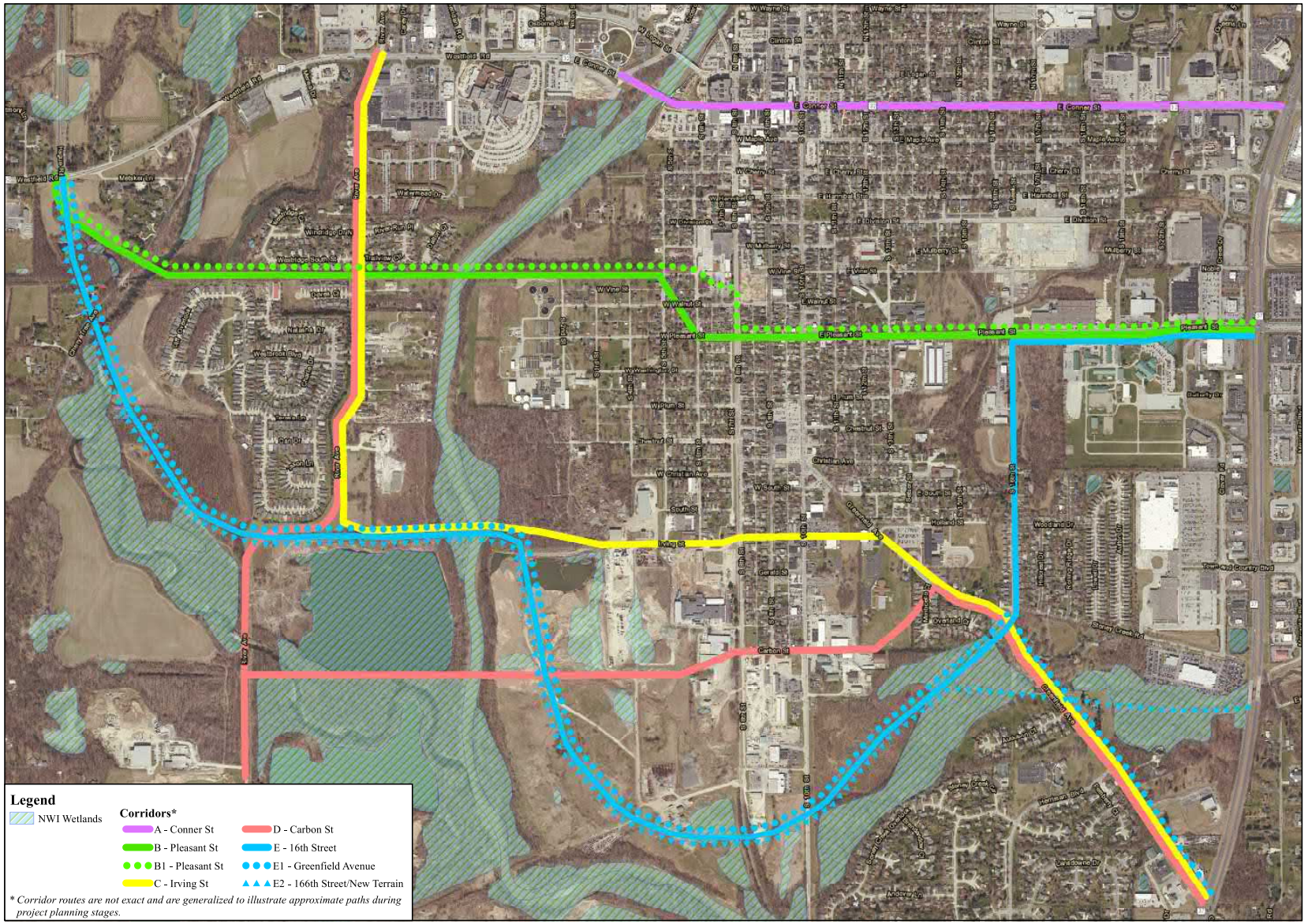
DES No TBD

CHA Project No 059473

Scale 1" = 900'

Image Courtesy of the IndianaMap
Photo Date: 2017

B-2



NWI Wetlands Map

East-West Corridor Project
Noblesville, Hamilton County, Indiana

design/construction solutions

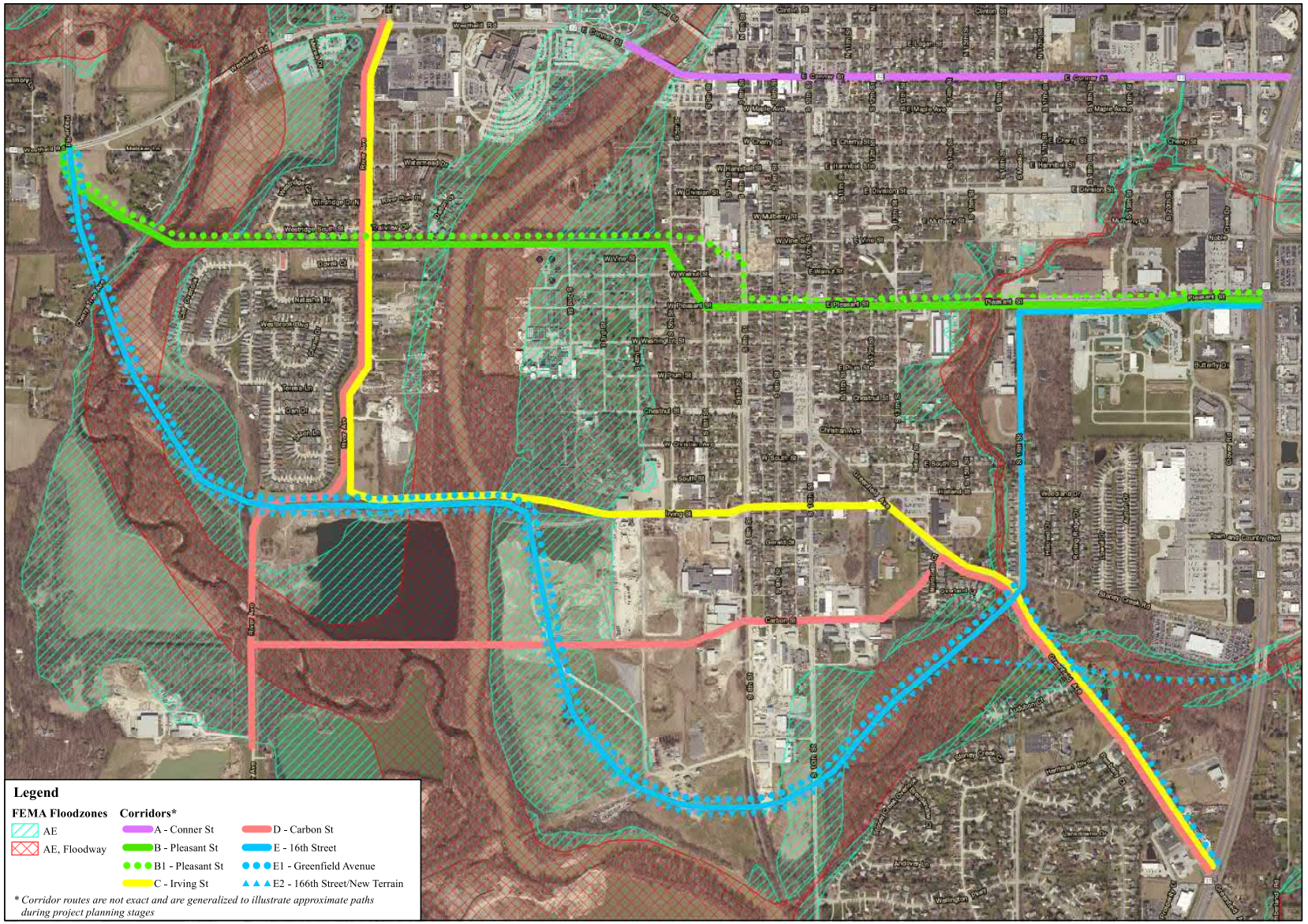
Scale 1" = 860'

CHA Project No 059473

DES No TBD

Image Courtesy of USGS and of the IndianaMap Earthstar Geographics SIO © 2014 Nokia © Photo Date: 7/4/2014 NWI Wetland data courtesy of the National Wetlands Inventory produced by the U.S. Fish and Wildlife Service

B-3



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FEMA Floodzones Map

East-West Corridor Project
Noblesville, Hamilton County, Indiana

DES No TBD

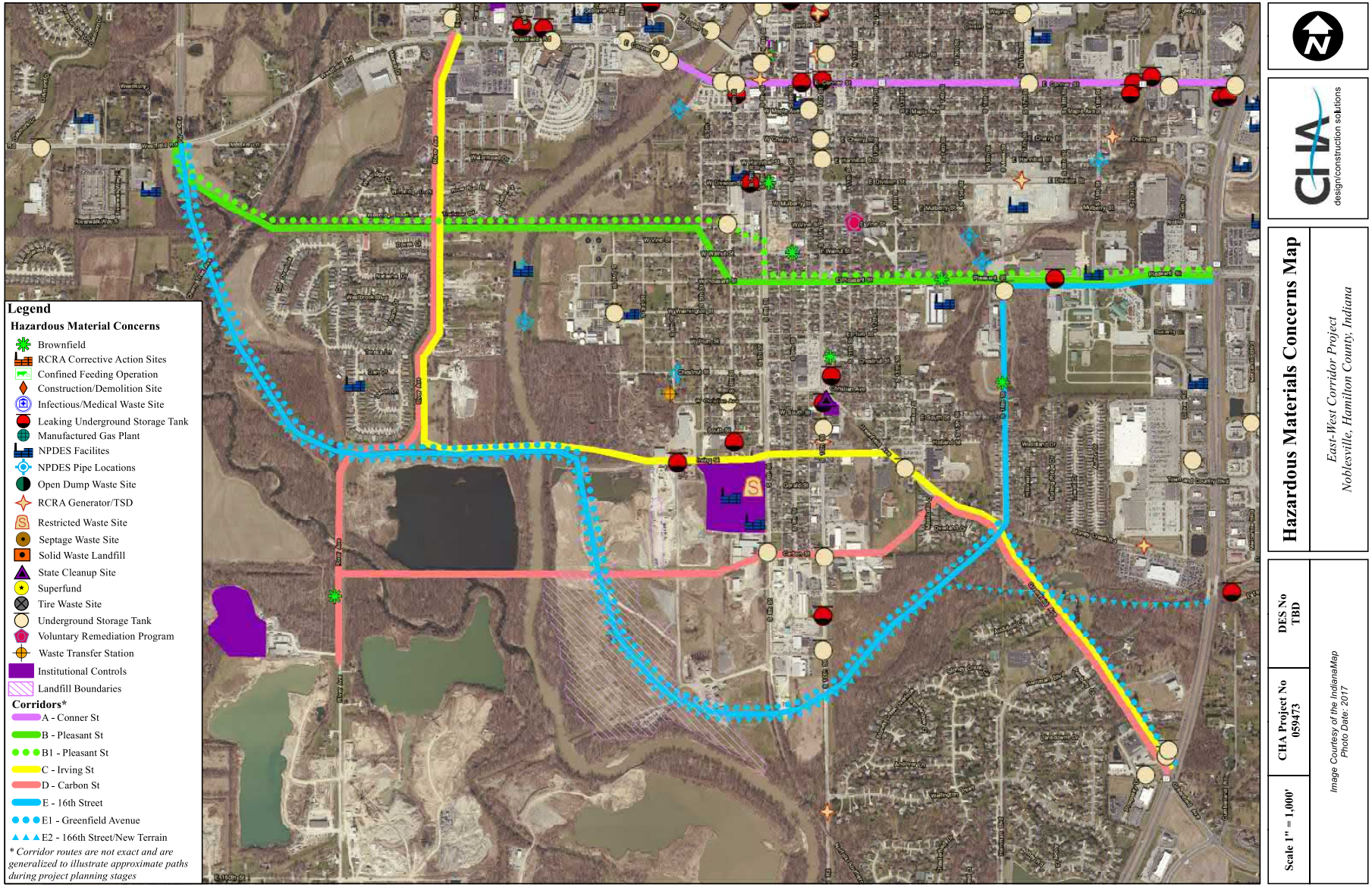
CHA Project No 059473

Scale 1" = 860'

Image Courtesy of USGS and of the IndianaMap Earthstar Geographics SIO © 2014 Nokia ©. - Photo Date: 7/4/2014
FEMA Floodzones Courtesy of Federal Emergency Mgmt Agency

B-4

Attachment B



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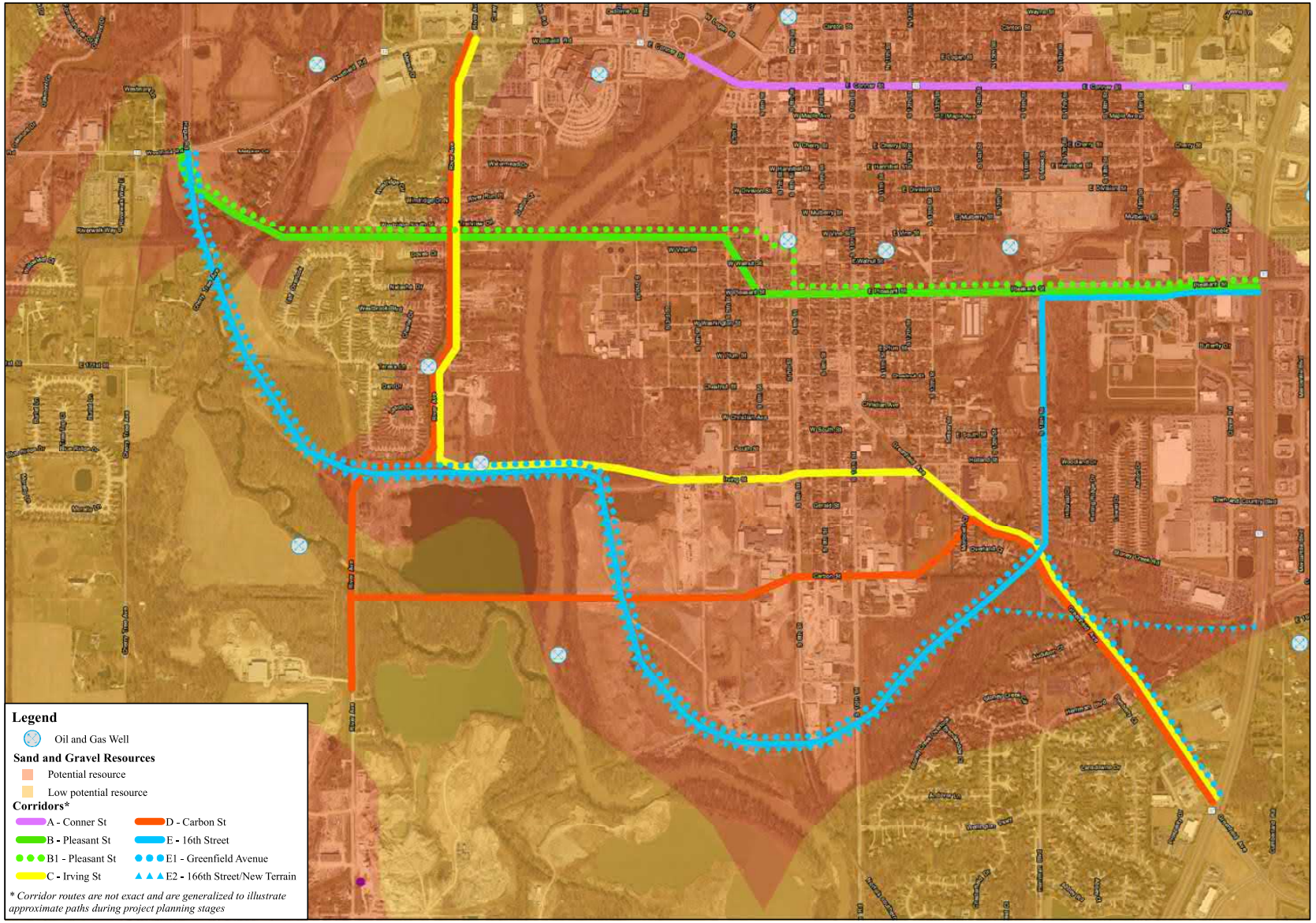


CHA design/construction solutions

Mineral Resources Map

East-West Corridor Project
Noblesville, Hamilton County, Indiana

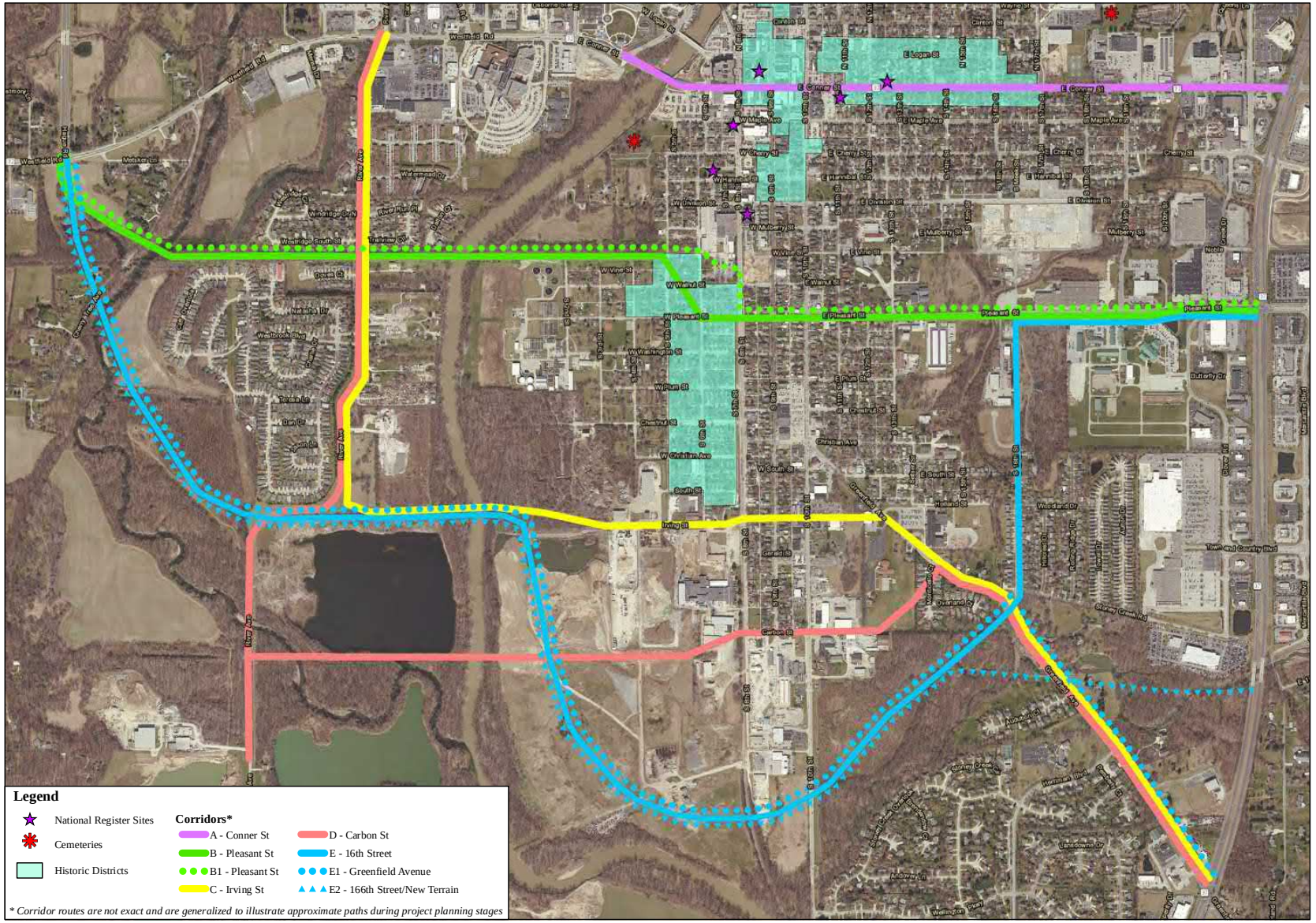
DES No TBD

CHA Project No 059473

Scale 1" = 1,000'

Image Courtesy of the IndianaMap
Photo Date: 2017

B-6



CHA design/construction solutions

Historic Resources Map

East-West Corridor Project
Noblesville, Hamilton County, Indiana

DES No TBD

CHA Project No 059473

Scale 1" = 900'

Image Courtesy of the IndianaMap
Photo Date: 2017

B-7

STEVEN J. FEHRIBACH, P.E.
PRESIDENT
R. MATTHEW BROWN, P.E.
VICE PRESIDENT
KAREN K. COLLINS, P.E.
VICE PRESIDENT
JOSEPH T. RENGEL, P.E.
VICE PRESIDENT

MEMORANDUM

DATE: 4/9/2020

TO: Alison Krupski, PE
City of Noblesville Engineer

cc: Mark Maurovich, PE Hardik Shah, PE Ryan Huebschman, PE
American Structurepoint Inc.

FROM: Matt Brown, PE/PTOE
A&F Engineering Co., LLC

RE: White River Bridge Alternative Analysis

A&F Engineering conducted an alternative analysis in 2016 to estimate the percent of traffic that would divert from SR 32 between River Road and SR 37 based on a future bridge constructed over the White River at the following 3 location options:

- Pleasant Street
- South Street
- Carbon Street

The attached Figure 1 shows each of these alignment options.

The results of this analysis were as follows:
Pleasant Street - Approximately 24% reduction in daily traffic along SR 32
South Street - Approximately 10% reduction in daily traffic along SR 32
Carbon Street - Approximately 8% reduction in daily traffic along SR 32

At the request of the City of Noblesville, an additional analysis has been conducted to analyze the impact on SR 32 traffic if a Greenfield Avenue/Irving Street White River crossing option was constructed (Option E1 on the attached Figure 2). As with the previous analysis done in 2016, this analysis was conducted using VISUM software, a comprehensive traffic modeling software that models traffic flow and routes based on existing traffic volume data and origin-destination data.

The results of this analysis showed that there would be a reduction of SR 32 traffic by approximately 10% if this alternative was constructed. Therefore, it can be concluded that this route would be fair less effective than the Pleasant Street corridor option in reducing SR 32 traffic between River Road and SR 37.

8365 KEYSTONE CROSSING, SUITE 201 – INDIANAPOLIS, INDIANA 46240
TELEPHONE (317) 202-0864 – WWW.AF-ENG.COM

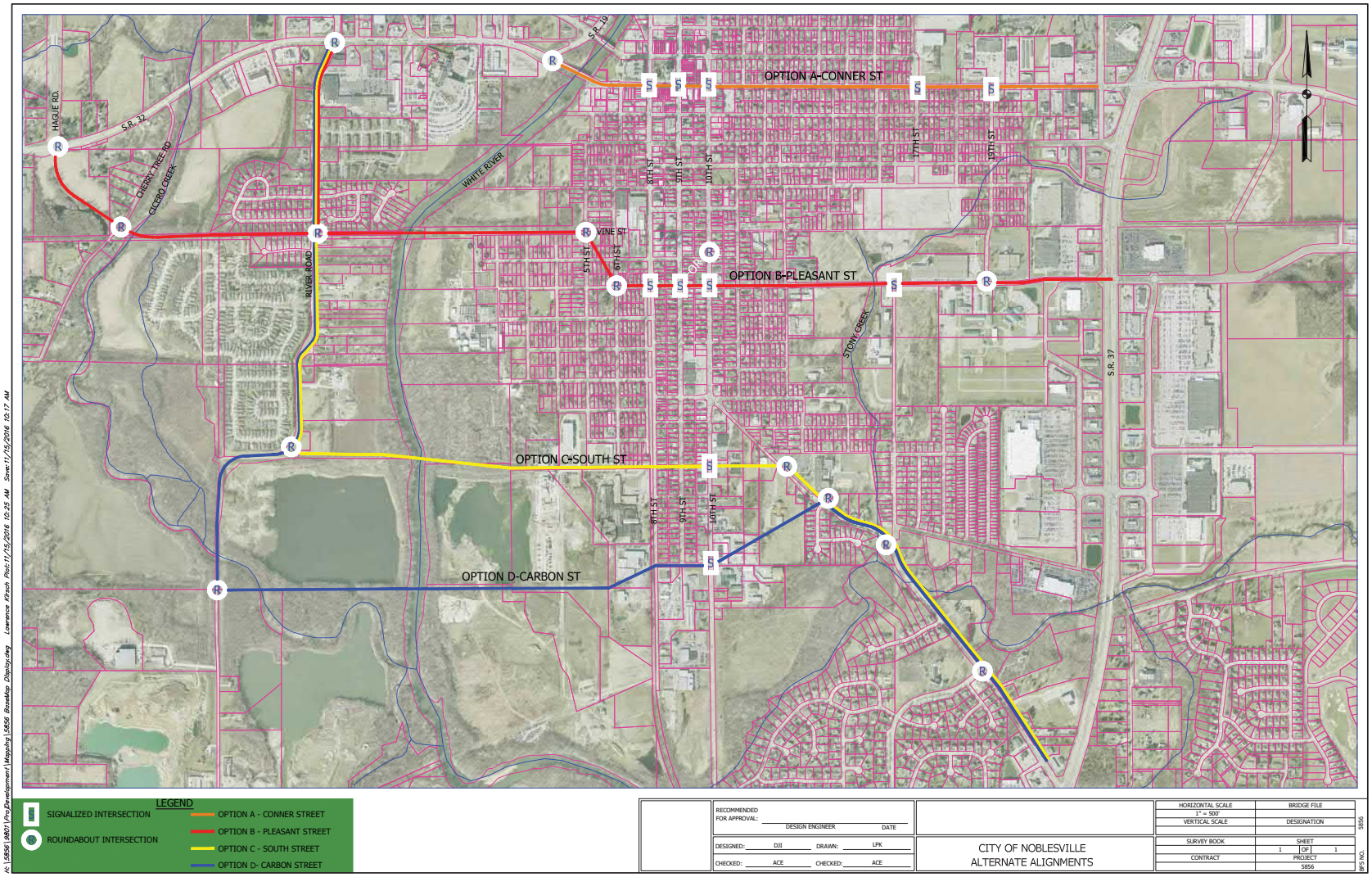
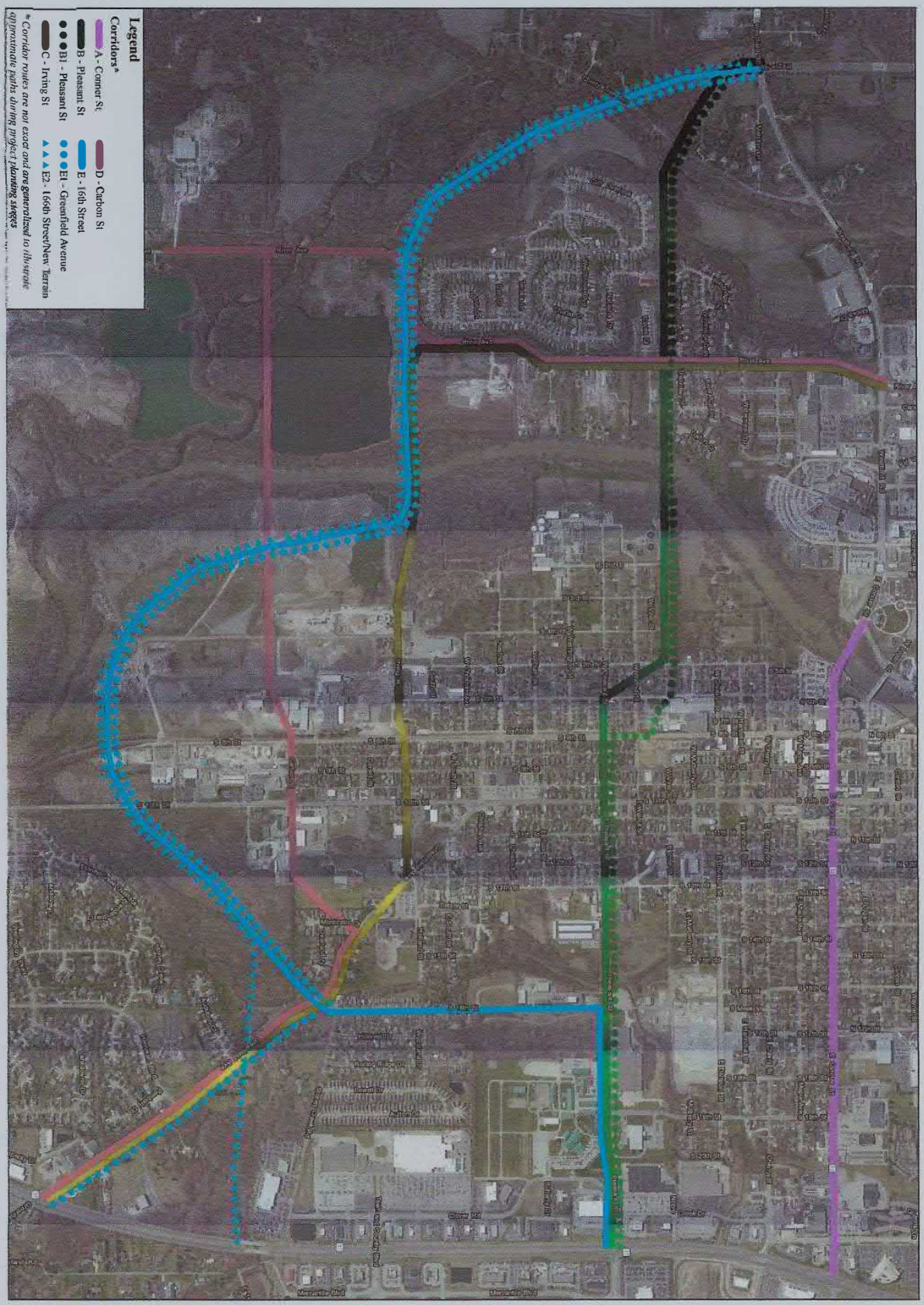

OPTION A-CONNER ST
OPTION B-PLEASANT ST
OPTION C-SOUTH ST
OPTION D-CARBON ST
S.R. 19
S.R. 32
S.R. 37
HAGUE RD.
CHERRY TREE RD
CICERO CREEK
WHITE RIVER
RIVER ROAD
VINE ST
5TH ST
6TH ST
7TH ST
8TH ST
9TH ST
10TH ST
17TH ST
19TH ST
STONY CREEK
LEGEND
SIGNALIZED INTERSECTION
ROUNDABOUT INTERSECTION
OPTION A - CONNER STREET
OPTION B - PLEASANT STREET
OPTION C - SOUTH STREET
OPTION D- CARBON STREET
RECOMMENDED FOR APPROVAL:
DESIGN ENGINEER
DATE
DESIGNED: DJI
DRAWN: LPK
CHECKED: ACE
CHECKED: ACE
CITY OF NOBLESVILLE
ALTERNATE ALIGNMENTS
HORIZONTAL SCALE
1" = 500'
VERTICAL SCALE
BRIDGE FILE
DESIGNATION
SURVEY BOOK
SHEET
1 OF 1
CONTRACT
PROJECT
5856
BFS NO.
5856

FIGURE 1



Scale 1" = 900'	CHA Project No 33469	DES No TBD	Aerial Location Map	CHA design/construction solutions	
Image Courtesy of the IndianaMap Photo Date: 2017			East-West Corridor Project Noblesville, Hamilton County, Indiana		

FIGURE 2

Pleasant Street Traffic Study

Phase 1: River Road to 10th Street

Prepared for:

City of Noblesville
Hamilton County, IN

April, 2020

AMERICAN STRUCTUREPOINT INC.

9025 RIVER ROAD, SUITE 200
INDIANAPOLIS, INDIANA 46240
TEL 317.547.5580
FAX 317.543.0270

Pleasant Street Traffic Study
Phase 1: River Road to 10th Street

Pleasant St Extension

City of Noblesville – Hamilton County, Indiana

April, 2020

I certify that this TRAFFIC ANALYSIS MEMORANDUM has been prepared by me or under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering.

C. Ryan Huebschman, PE, PTOE

Indiana Registration #PE11400171

AMERICAN STRUCTUREPOINT INC.

9025 RIVER ROAD, SUITE 200
INDIANAPOLIS, INDIANA 46240
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Executive Summary

The purpose of this report is to document the traffic operations analysis of the proposed Pleasant Street Extension Phase 1 roundabout intersections located in the City of Noblesville, in Hamilton County, Indiana. The study reviews previously performed analysis, updates traffic volume projections, and develops capacity and operations analysis for the proposed roundabout intersections. Additionally, the required intersection geometrics and lane configurations will be determined to accommodate projected traffic demand spurred by anticipated growth and development in the surrounding areas. The analysis considered the "full build" condition of the Pleasant Street Extension extending from Hague Road to SR 37. **Figure 1.1** shows the study area and the proposed alignment of the Pleasant Street extension. The project is planned to be constructed in separate phases, with Phase 1 proposed to extend Pleasant Street to the west of 10th Street connecting to River Road through a new roadway segment. This study documents the updated traffic analysis for the 4 (four) roundabout intersections to be constructed in Phase 1 of the proposed extension of Pleasant Street.

The updated scenarios were the AM and PM peak hours of traffic for an open, interim and design year of the project as follows:

- Opening Year 2025
- Interim Year 2035
- Design Year 2045

Turning movement count data was collected on a typical weekday to identify AM and PM peak hour volumes. Annual growth trends from nearby locations revealed an annual average growth of 1.50%. These were used to forecast peak hour turning movement volumes for the horizon years of the project.

The four (4) intersections evaluated in this study were:

1. Proposed Pleasant Street & River Road (new intersection)
2. Proposed Pleasant Street/Walnut Street & 8th Street (new intersection)
3. Pleasant Street & 8th Street
4. Pleasant Street & 10th Street

The recommended roundabout configurations are intended to avoid lane changes in between the three roundabouts in close range of each other at the intersections of Pleasant Street with 8th Street/Walnut Street, 8th Street, and 10th Street. These configurations are expected to operate efficiently with an acceptable level of service for all of the intersections through the design year.

Following project discussion meetings, the City of Noblesville requested that an annualized growth rate of 2.0% be used to evaluate the proposed roundabout configurations. The configuration updates that resulted were as follows:

- River Road: Add a westbound right-turn bypass (east approach on Pleasant Street Extension)
- 10th Street: Add 2nd entry lane on south approach of 10th Street. The new configuration of the approach consists of one shared left/through lane, and one right-turn pocket lane.

These additional improvements to the roundabout configurations enable the roundabout intersections along the corridor to operate efficiently with the updated traffic volume projection.

1.0 Study Purpose and Scope

1.1 Purpose

The purpose of this report is to document the traffic operations analysis of the proposed Pleasant Street Extension Phase 1 roundabout intersections located in the City of Noblesville, in Hamilton County, Indiana. The study reviews previously performed analysis, updates traffic volume projections, and develops capacity and operations analysis for the proposed roundabout intersections. Additionally, the required intersection geometrics and lane configurations were determined to accommodate projected traffic demand spurred by anticipated growth and development in the surrounding areas. This report presents the analysis methodology, calculations, results and recommendations.

1.2 Scope

The scope of this study includes data analysis, volume development, capacity and operations analysis, and preparation of a summary report to document study efforts, results and recommendations for four (4) intersections along Phase 1 of the proposed Pleasant Street Corridor.

The phase 1 extension of the Pleasant Street corridor is proposed to connect River Road and 10th Street in an East-West oriented new roadway segment. This study specifically focuses on the performance of four (4) intersections; two (2) existing intersections that are proposed to be converted to roundabouts along the existing portion of Pleasant Street, and two (2) new roundabout intersections resulting from the proposed Pleasant Street Extension junctions. These intersections are:

1. Pleasant Street & River Road (new intersection)
2. Pleasant Street/Walnut Street & 8th Street (new intersection)
3. Pleasant Street & 8th Street
4. Pleasant Street & 10th Street

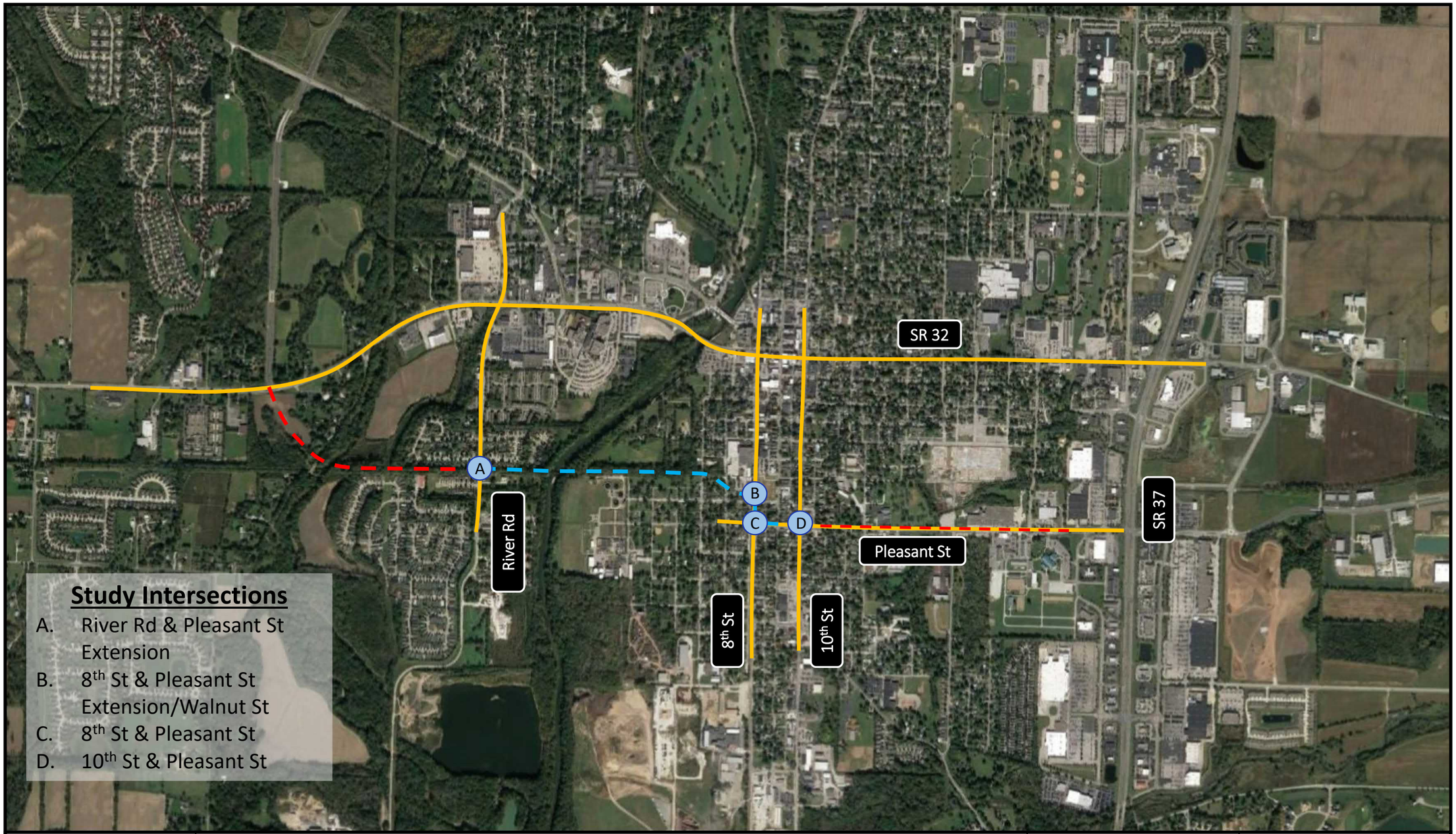
The focus intersections are depicted in the study area map in **Figure 1.1.**

An area-wide study was previously developed by others that included the 4 intersections in consideration. The study was submitted in April 2018, and an updated report followed in October 2018. The most recent report includes updated annual growth rates and traffic distributions.

This study will further evaluate the previously presented data and update traffic volumes to align with the latest available volume trends and growth projections for the area. It includes an AM and PM peak hour analysis for the opening, interim and design year of the project. These are proposed as follows:

- Opening Year (2025)
- Interim Year (2035)
- Design Year (2045)

Traffic operations analysis results and recommendations are documented in this report.


SR 32
A
B
C
D
River Rd
8th St
10th St
Pleasant St
SR 37
Study Intersections
A. River Rd & Pleasant St Extension
B. 8th St & Pleasant St Extension/Walnut St
C. 8th St & Pleasant St
D. 10th St & Pleasant St
Legend
Study Intersection Location
Study Area Roadway Network (Existing)
Proposed Pleasant St Extension Alignment (Phase I)
Proposed Pleasant St Extension Alignment (Other Phase)
Pleasant St Extension
Traffic Analysis
Noblesville, IN
Figure 1.1
Study Area

2.0 Study Area

The existing roadway conditions adjacent to the study site are discussed in the following sections:

2.1 Study Area Roadways

Pleasant Street is a two-lane undivided east-west urban minor arterial with a posted speed limit of 20 mph within the vicinity of the subject intersections.

8th Street is a north-south urban minor arterial with a two-lane undivided cross-section. The posted speed limit is 30 mph in the study segment.

10th Street is an east/west two-lane undivided urban principal arterial with a posted speed limit of 25 mph within the vicinity of its intersection with Pleasant Street.

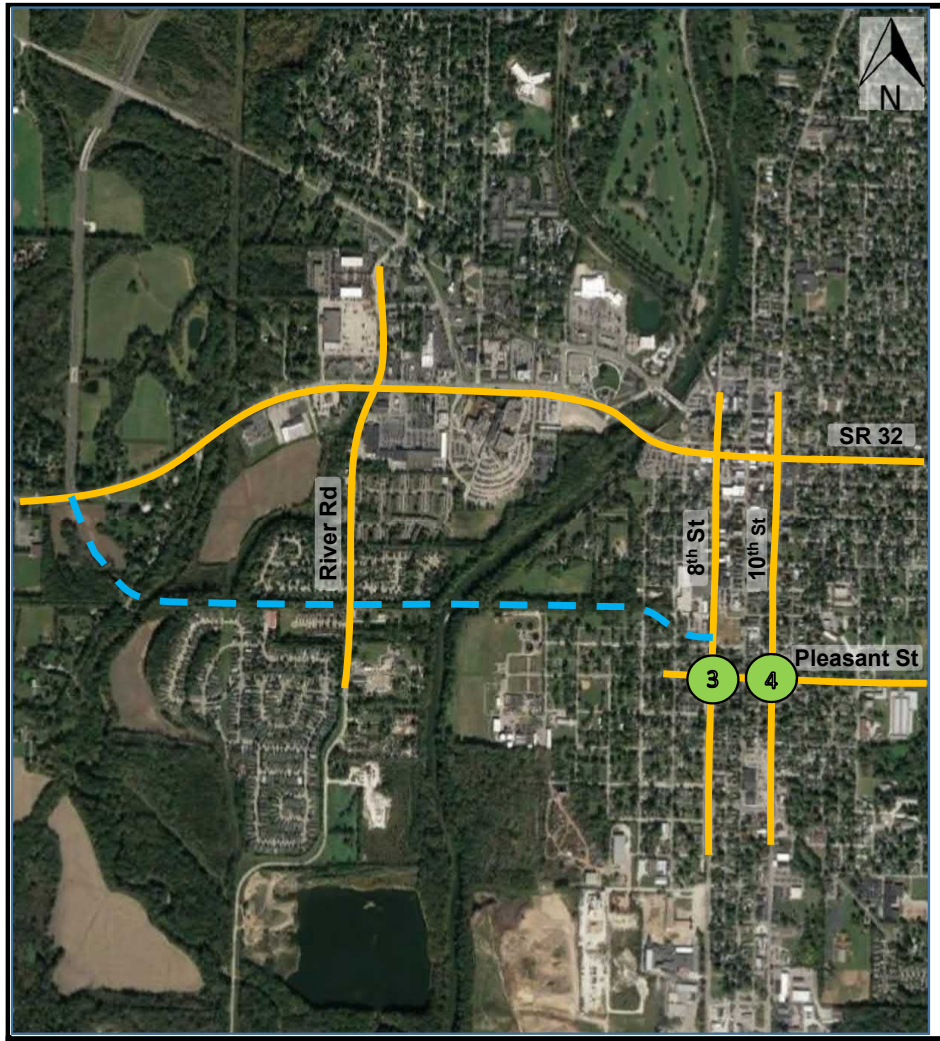
SR 38/SR 32 is an east-west urban principal arterial that serves as a major thoroughfare in the area, as it connects Noblesville to West Noblesville across the White River. Although this street is not directly connected to any of the focus intersections, the proposed extension is expected to reduce the proportion of east-west traffic that currently operates on SR 32.

2.2 Study Area Intersections

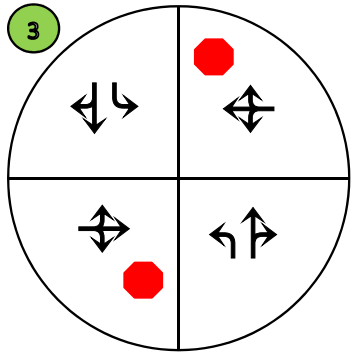
Figure 2.1 illustrates the existing intersection lane configuration and traffic control for each study intersection.

10th Street (north-south) forms a traditional four-legged intersection with Pleasant Street (east-west) controlled by a signal. The southbound approach has an exclusive left-turn bay with protected/permissive left turn phasing. The remaining eastbound, westbound and northbound approach are single-lane approaches with permissive only left-turn phasing for the northbound approach. Left-turn movements from the eastbound and westbound approaches are prohibited.

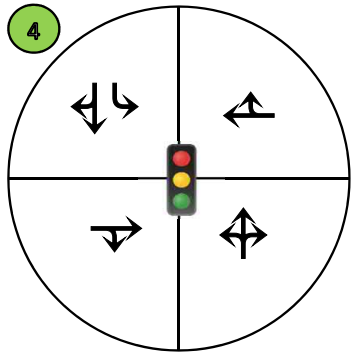
8th Street (north-south) forms a traditional four-legged intersection with Pleasant Street (east-west). The 8th Street approaches are uncontrolled and the Pleasant Street approaches are stop-controlled. The northbound and southbound approaches on 8th Street have an exclusive left-turn bay.



8th St & Pleasant St



10th St & Pleasant St



EB and WB left-turn movements currently prohibited

Legend

1 Study Intersection

Signalized Intersection

Stop-Controlled Approach

Existing Roadway Alignment

Proposed New Roadway Alignment

Pleasant St Roundabouts
Noblesville, IN

Figure 2.1
Existing Intersection Traffic Control & Lane Configuration

2019.01575

Defining the built environment.

3.0 Traffic Volume Development & Forecast

The following sections discuss the volume development methodology that was adopted for this study.

3.1 Traffic Data Collection and Corridor Peak Hours

Intersection turning movement counts were collected in September 2017 at various intersections along Pleasant Street and SR 32/SR 38 as part of the *SR 32 and Pleasant Street Corridor Study* (April 2018) completed by others. These included 2 existing intersections from the focus intersections analyzed in this study: Pleasant Street & 8th Street, and Pleasant Street & 10th Street.

The 24-hour turning movement counts were collected to capture the typical daily traffic patterns and determine peak periods of traffic occurring throughout the day.

The peak hours of traffic from the *SR 32 and Pleasant Street Corridor Study* were determined to be from 7:00 – 8:00 AM, and from 4:45 – 5:45 PM.

The baseline intersection turning movement volumes from the corridor study and the raw turning movement count data is provided in **Appendix A**.

3.2 Annual Growth Rate

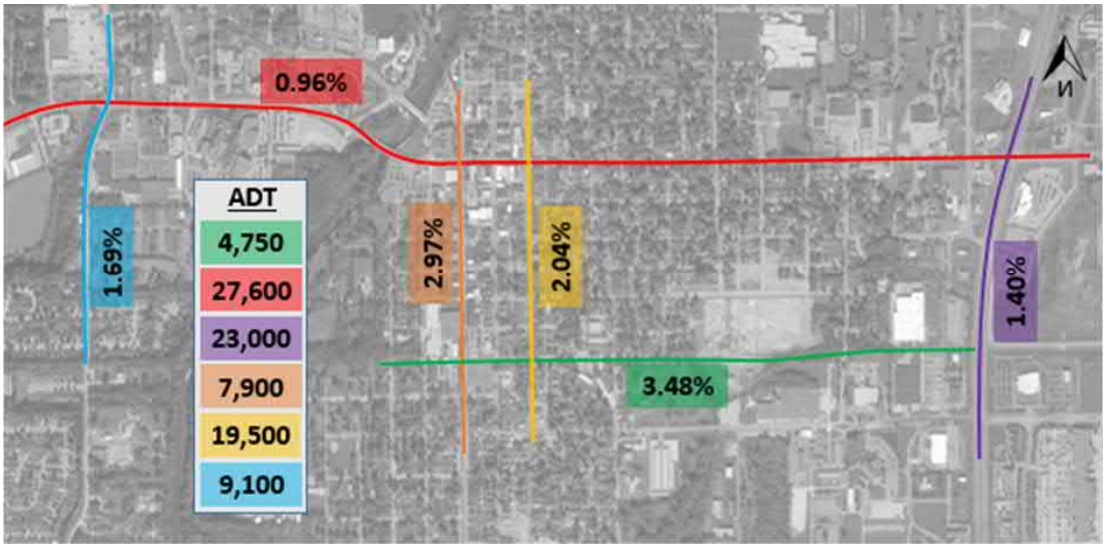
The *SR 32 and Pleasant Street Corridor Study* (April 2018) used an annual growth rate of 1.50%. The revision to the study, which was submitted in October 2018, used a more aggressive annual growth rate of 2.0% to account for proposed development in the area.

For comparison purposes and the intended updates of this study, an updated annual growth rate was determined from regional travel demand model data. This was obtained from the Indianapolis Metropolitan Planning Organization (MPO). Four line-diagram models displaying links with directional flows were used to estimate the growth. These were a base year 2020, and horizon years 2025, 2035 and 2045. To estimate a regional annual growth rate, the main corridors comprising the study area were considered. The individual annual growth rate for each of these corridors were averaged based on their average daily traffic (ADT)-weighted annual growth.

The MPO model did not account for the build condition for the Pleasant Street extension project. Therefore, a growth rate estimate was based exclusively on the regional travel demand model growth along the corridors in the area that were considered for this study.

Figure 3.1 shows the corridor growth rate projections obtained from the travel demand model data that were used to select the ADT-weighted average annual growth rate for the current project.

Figure 3.1 – Area Average Annual Growth Rates



The data was used to calculate an annual growth rate that accurately represents the growth trend in the area over recent years and forecasts projected growth for the design life of the project. The growth rate used was 1.50% as it better resembles the traffic growth projections accounting for volumes in each of the main corridors under consideration. This number represents historical growth trends and projections from the regional travel demand model, whereas the growth rate of 2.0% used previously was considered to model a more aggressive growth trend than that which is expected for the corridor. An assessment of the surrounding areas to Pleasant Street showed that most parcels are developed, indicating a redevelopment of the area would, to a certain extent, replace existing trips. The 1.50% annual growth rate accounts for regional growth in addition to potential redevelopment in the vicinity of the corridor.

This annualized growth rate is assumed to remain constant over the design life of the project, and therefore it is used to calculate traffic projections for both the open and design years. Additionally, the forecasting methodology used assumes that growth is constant in all directions. Consequently, the growth rate is applied uniformly to all turning movement counts at the intersections.

3.3 Traffic Redistribution

The SR 32/SR 38 route, as previously mentioned, provides the main east-west thoroughfare connecting West Noblesville to Noblesville across the White River. Consequently, most traffic in the area must use the SR 32/SR 38 route to traverse the area. The number of possible origin-destination paths limits the potential to exactly determine the amount of traffic using either SR 32/SR 38 or the proposed Pleasant Street extension as an east-west thoroughfare. The *SR 32 and Pleasant Street Corridor Study* (April 2018) presented results

from a PTV VISSUM model that determined the routes to be used by vehicles in horizon years and the amount of traffic to be diverted to the Pleasant Street extension.

The methodology adopted for this study are based on the volume distributions presented in the *SR 32 and Pleasant Street Corridor Study* (April 2018) , where specific intersections were scrutinized to validate the probable traffic volume distribution and trip diversion in build conditions. A "checks and balances" system was adopted to maintain similar total traffic flows in an east-west direction in a no-build scenario, as in the build scenario, that ensured traffic volumes were neither significantly increased nor reduced in the traffic volume that traversed the area.

The proposed corridor realigns the existing Pleasant Street to overlap a portion of 8th Street as it jogs to the north. To account for this jog in the proposed Pleasant Street corridor alignment, traffic volumes at the intersection of Pleasant & 8th Street were redistributed to account for the through movement of the proposed Pleasant Street corridor.

The volumes were then rearranged to accurately represent the possible turning movements from each approach that match the geometric configuration of the proposed Pleasant Street alignment.

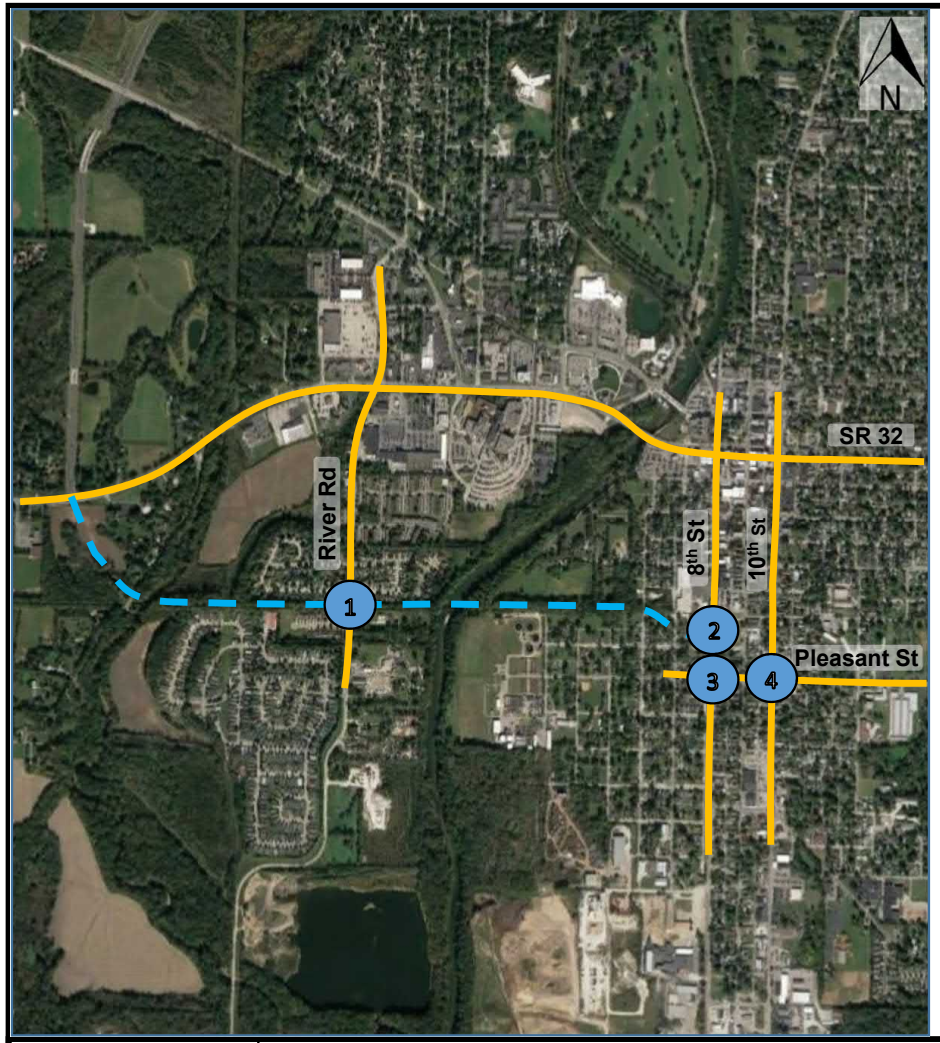
Key assumptions in redistributing the volumes were:

- A portion of traffic from EB SR 32 and Northbound River Road reroutes directly to the Pleasant Street Extension, to avoid the SR 32 & 8th Street intersection. The proportions of traffic flow origin-destination and turning movement volumes were based on the build model presented in the *SR 32 and Pleasant Street Corridor Study* (April 2018)
- The existing traffic distribution at the intersection of SR 32 & 8th Street was applied to the projected volume of traffic on Pleasant Street Extension & 8th Street to develop turning movement counts at the new intersection
- Due to Pleasant Street becoming a roundabout corridor, it will become a more efficient travel route, attracting a portion of eastbound and westbound traffic from SR 32.
- Projected traffic volumes and distributions were developed based on the full build condition of the Pleasant Street Extension corridor as a conservative estimate, although only Phase 1 could be completed by the opening year of the project.

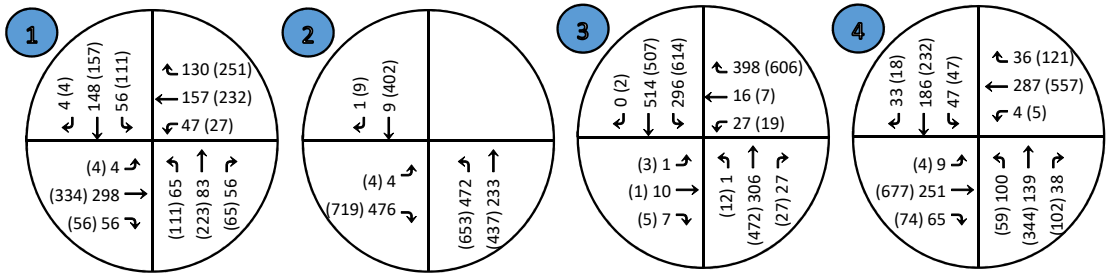
3.4 Traffic Volumes Forecast

The obtained annual growth rate of 1.50% (linear) was applied to the year 2018 traffic volumes to forecast the AM and PM peak hours of the opening, interim and design years. The construction of the Pleasant Street Extension is assumed to be implemented by year 2025 and to have a design life cycle of 20 years for analysis; hence the opening year scenario is 2025 and the design year is 2045. **Figure 3.2** summarizes the year 2025, 2035 and 2045 traffic turning movement volumes for the weekday peak hours.

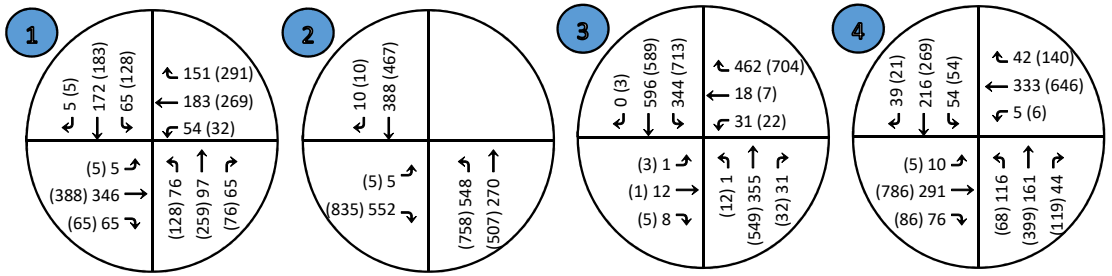
Traffic redistribution and growth forecasts were used to adjust the projected traffic turning movement volumes at each intersection. These volumes were then used to develop the roundabout lane configurations based on intersection capacity analysis of design year peak hour scenarios.



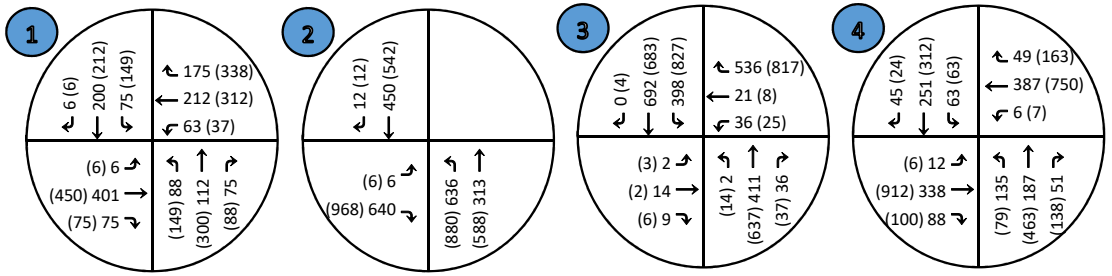
Open Year 2025



Interim Year 2035



Design Year 2045



AMERICAN STRUCTUREPOINT INC

Legend

1 Study Intersection

Peak Hour Volumes
XX (XX)
AM PM

Existing Roadway Alignment

Proposed New Roadway Alignment

Pleasant St Roundabouts
Noblesville, IN

Figure 3.2
Peak Hour Traffic Turning Movement Volumes

2019.01575

Defining the built environment.

4.0 Intersection Configurations

Following the Indiana Department of Transportation (INDOT) intersection analysis procedures, each roundabout was initially analyzed as a single-lane roundabout. Then, additional through lanes or turn lanes were added at each intersection as they were required for acceptable level of service. The north-south segment of 8th Street/Pleasant Street Extension from Walnut Street to Pleasant Street and the east-west segment of Pleasant Street from 8th Street to 10th Street were determined to require two through lanes to accommodate the anticipated traffic volumes circulating through these segments. The lane configurations required for each of the focus intersections are described in the following sections.

4.1 Pleasant Street Extension and River Road

A single-lane roundabout is retained at this intersection. The existing lane configuration along River Road and the anticipated lane configuration of the Pleasant Street extension are two-lane roadways. The projected volumes at this intersection are under the threshold for maximum entry flow of 1,200 vehicles per hour per lane. This number represents an industry standard practice that determines the applicability of a single-lane roundabout to an intersection on a planning level. Additionally, the number of conflicts within the roundabout and results from capacity analysis indicated that a single lane roundabout is adequate for this location. To accommodate the high westbound right turn volume, consisting mainly of the traffic expected to divert from SR 32 to the Pleasant Street extension, a westbound right turn bypass is proposed for this roundabout in the design year. To optimize operations at this intersection, the roundabout is recommended to open with a single-lane configuration on all approaches, and the westbound right turn bypass is recommended to be implemented at a later phase as demand grows and the approach requires additional capacity in a future year scenario.

Figure 4.1 shows a conceptual layout of the proposed roundabout configuration for the intersection of River Road and Pleasant Street Extension.

4.2 8th Street and Pleasant Street Extension/Walnut Street

This intersection would replace the existing Walnut Street at 8th Street intersection, just north of its current location. The existing Walnut Street approaches would be closed at 8th Street, restricting access to and from the side streets. The new intersection would have the Pleasant Street extension for a west leg, and no east leg.

The approaches with the largest volumes at this intersection are expected to be the west leg (Pleasant Street Extension) and the south leg of the intersection, following the Pleasant Street alignment for vehicles traveling in an east-west route. Specifically, the higher volume movements are expected to be the eastbound right turn and the northbound left turn. To accommodate these volumes, the eastbound approach is proposed to be configured as a left/right-turn lane and an exclusive right-turn lane, and the northbound approach is proposed to be configured as an exclusive left-turn lane and a left/through-lane. Additionally, dual right-turn lanes are supported on the eastbound approach to prevent forming a pronounced downstream weaving conflict which could lead to lane over/underutilization. Similarly, the northbound dual-left turn-lanes are proposed to avoid a pronounced weaving conflict between the northbound through and northbound left turning vehicles, and to promote a more equally distributed lane utilization. Traffic volumes on the north leg (southbound) of the intersection are expected to be moderate, and the required

configuration for the southbound approach would be a through lane and a through/right lane. The intersection would require two circulating lanes, except at the south leg, where only 1 circulating lane would suffice to accommodate eastbound left volumes during peak hours. It is recommended to install guide signs/pavement markings in order for drivers to enter their designated lane in advance of the roundabout and minimize weaving in the segment between the roundabouts.

If a fourth leg is introduced to the intersection on the east side, the intersection configuration and lane designations at each approach would have to be re-evaluated.

Figure 4.2 shows a conceptual layout of the proposed roundabout configuration for the intersection of 8th Street and Pleasant Street Extension/Walnut Street.

4.3 8th Street and Pleasant Street

The existing intersection is configured as two-way stop controlled with the stop control at the Pleasant Street approaches (east and west). 8th St has north and south exclusive left-turn lanes at the intersection.

Similar to the proposed roundabout at 8th St and Pleasant St extension just north of this intersection, the volume distribution is concentrated on the east-west routes along Pleasant Street and the portion of 8th Street between existing Pleasant Street and the proposed extension.

The higher volume movements are expected to be the westbound right turn and the southbound left turn. The configuration for the westbound approach is proposed to be a left/through/right lane and an exclusive right-turn lane, and the southbound approach is proposed to be configured as an exclusive left-turn lane and a left/through/right lane. Southbound left-turns and eastbound right-turns are allowed from both roundabout entry lanes to properly accommodate the significant traffic volumes at these major movements. In the westbound approach, right turns are allowed from both lanes to prevent forming a prominent downstream weaving conflict which could lead to lane over/underutilization. The southbound left turn movement is allowed from both entering lanes to the roundabout to avoid a pronounced weaving conflict between the southbound through and southbound left turning vehicles on the approach to the roundabout, and to promote a more equally distributed lane utilization. The west leg of the roundabout would maintain a relatively low traffic volume as the street serves mostly a residential area.

Figure 4.3 shows a conceptual layout of the proposed roundabout configuration for the intersection of 8th Street and Pleasant Street.

4.4 10th Street and Pleasant Street

This intersection is currently a signalized intersection with single-lane approaches on Pleasant Street and the northbound approach on 10th Street, while the southbound approach on 10th Street has a left turn bay and a shared through/right lane.

The proposed roundabout configuration includes dual entry lane approaches on Pleasant Street, and single entry lane approaches on 10th Street. There are two circulating lanes in the roundabout at the north/south ends, and single circulating lanes on the east/west ends of the roundabout for thru and left turn movements from the northbound and southbound approaches.

Figure 4.4 shows a conceptual layout of the proposed roundabout configuration for the intersection of 10th Street and Pleasant Street.

Figure 4.1 – Proposed Roundabout Configuration at River Road & Pleasant Street Extension

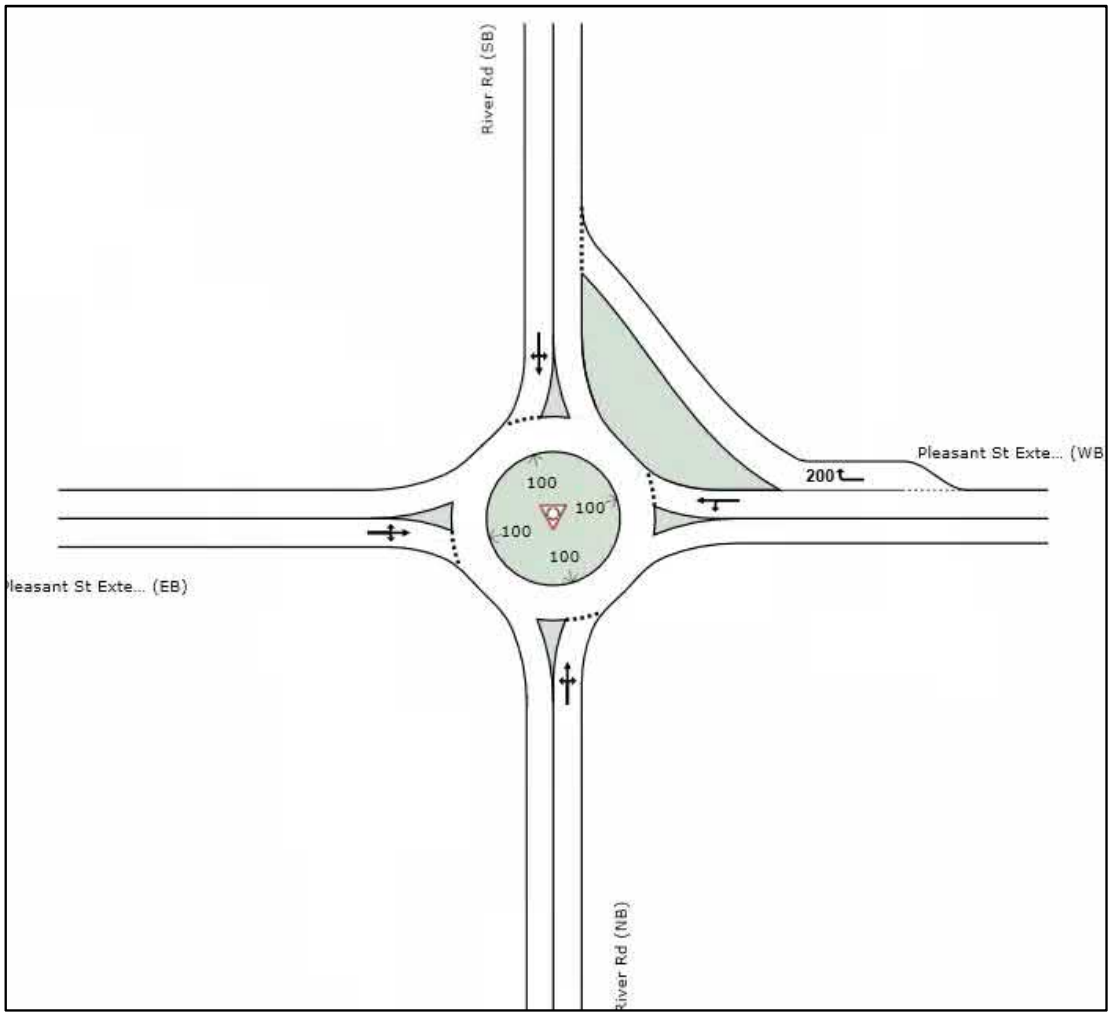


Figure 4.2 – Proposed Roundabout Configuration at 8th Street & Pleasant Street Extension/Walnut Street

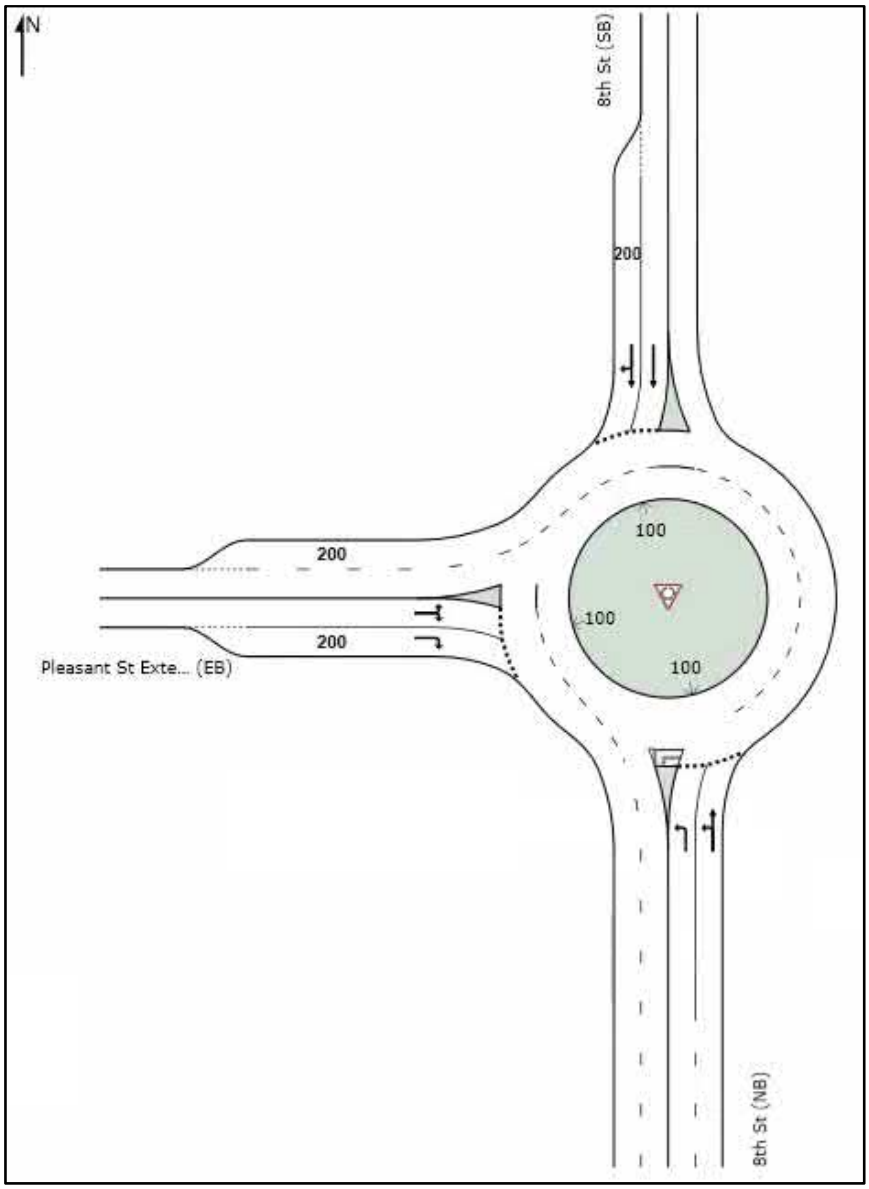


Figure 4.3 – Proposed Roundabout Configuration at 8th Street & Pleasant Street

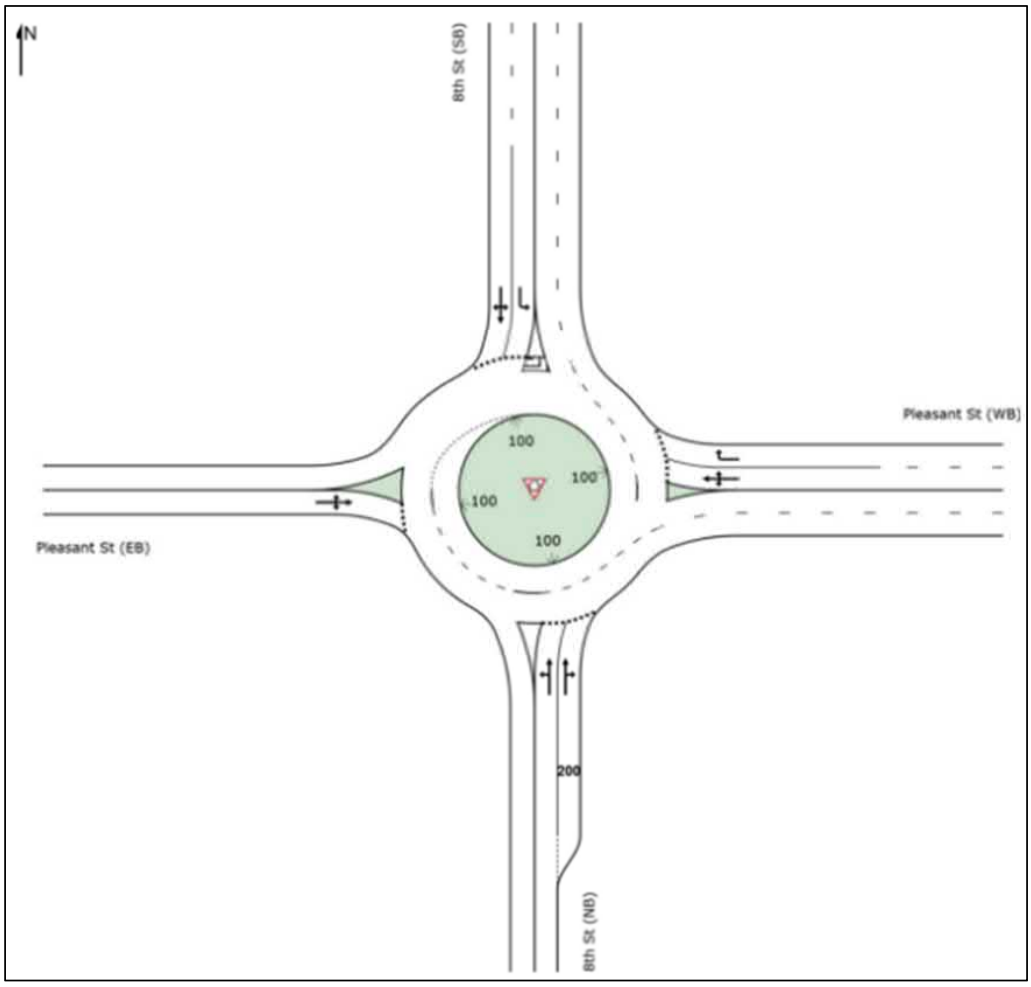
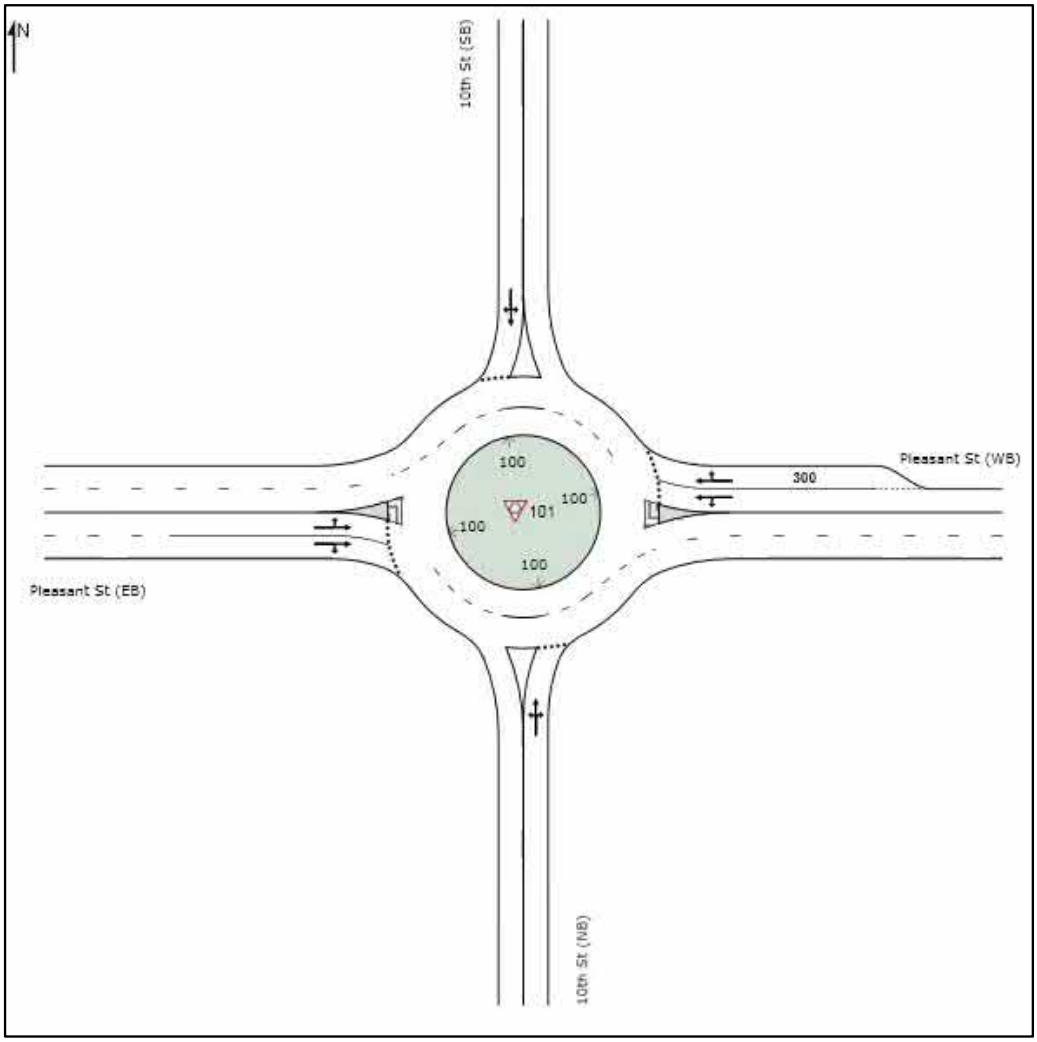


Figure 4.4 – Proposed Roundabout Configuration at 10th Street & Pleasant Street



5.0 Capacity Analysis

A capacity analysis has been performed for each of the study intersections and traffic volume scenarios based on the equations and methodologies listed in the Highway Capacity Manual (TRB, 2010). A capacity analysis evaluates the traffic operations of an intersection by comparing the traffic volume demand to the intersection's vehicle capacity.

The standard parameter used to evaluate an intersection's capacity is referred to as the level-of-service (LOS). There are six LOS (A through F) which relate to driving conditions from best to worst, respectively. LOS for signalized and unsignalized (stop-control and roundabout) intersections is defined in terms of control delay per vehicle, which is a direct correlation to driver discomfort, frustration, fuel consumption, and lost travel time. **Table 5.1** provides the LOS criteria as defined in the Highway Capacity Manual for both signalized and unsignalized intersections. An intersection is typically considered to be operating at an acceptable LOS if it is operating at LOS "D" or better.

Table 5.1 – LOS Thresholds

LOS	Signalized Intersection & Roundabout Control Delay per Vehicle (seconds)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	**> 35 and ≤ 55**
E	> 55 and ≤ 80
F	> 80

Roundabout capacity analysis was evaluated using SIDRA (Akcelik and Associates Pty Ltd, version 8.0). The INDOT intersection traffic analysis settings were used to be consistent with the preferred settings for local roundabout evaluation. The capacity analysis results are summarized in **Table 5.2** through **Table 5.5** for each study area intersection, peak hour, and traffic volume scenario. The output reports from the SIDRA analysis are provided in **Appendix B**.

5.1 Pleasant Street Extension & River Road

In the opening year (2025) the proposed roundabout at the intersection of Pleasant Street Extension and River Road is expected to experience LOS A in both AM and PM peak hours, with acceptable delays and moderate formation of queues on the approaches.

In the interim year (2035) the intersection is expected to slightly degrade in performance, experiencing a slight increase in delays and queues with the overall intersection LOS remaining at LOS A. Queues in the northbound approach during the PM peak hour are expected to experience a considerable increase from the opening year; however, the approach would maintain an acceptable delay representative of LOS A.

In the design year (2045) operating conditions are expected to slightly degrade from the interim year conditions as intersection throughput progressively increases. Degree of saturation (vehicle-to-capacity ratio) is expected to remain under 1.0 through the design year, indicating the intersection is expected to retain adequate capacity. Capacity analysis results for the intersection are presented in **Table 5.2**.

Table 5.2 – Capacity Analysis Results: Pleasant Street Extension & River Road

Pleasant Street Extension & River Road							
Horizon Year	Movement	AM			PM		
		Delay / LOS	V/C Ratio	Queue Length	Delay / LOS	V/C Ratio	Queue Length
Opening Year (2025)	EB Approach	4.9 / A	0.33	51	5.3 / A	0.39	65
	WB Approach	5.5 / A	0.29	44	6.5 / A	0.52	104
	NB Approach	6.0 / A	0.23	34	6.3 / A	0.44	77
	SB Approach	5.0 / A	0.20	26	6.8 / A	0.28	44
	Intersection	**5.3 / A**	**0.33**	-	**6.2 / A**	**0.52**	-
Interim Year (2035)	EB Approach	5.3 / A	0.40	66	5.8 / A	0.47	87
	WB Approach	5.7 / A	0.35	57	8.6 / A	0.65	172
	NB Approach	6.5 / A	0.28	45	8.2 / A	0.55	123
	SB Approach	5.3 / A	0.24	34	7.3 / A	0.35	59
	Intersection	**5.7 / A**	**0.40**	-	**7.6 / A**	**0.65**	-
Design Year (2045)	EB Approach	5.8 / A	0.48	87	7.3 / A	0.58	135
	WB Approach	5.3 / A	0.21	33	5.7 / A	0.33	65
	NB Approach	7.1 / A	0.35	60	12.6 / B	0.71	219
	SB Approach	5.7 / A	0.28	42	8.1 / A	0.43	77
	Intersection	**5.9 / A**	**0.48**	-	**8.3 / A**	**0.71**	-

5.2 8th Street & Pleasant Street Extension/Walnut Street

Due to the proposed alignment of the Pleasant Street Extension, this intersection is expected to experience heavy turning movements on eastbound to southbound traffic, and northbound to westbound traffic. However, with the proposed intersection configurations, operations are expected to satisfactorily accommodate the projected volumes.

In the opening year, the intersection is expected to operate at LOS A with minor delays and queuing on all approaches during both AM and PM peak hours.

In the interim year, delays and queues are expected to experience a slight increase, while all the approaches and the overall intersection maintain LOS A in both peak hours.

Operations are expected to experience only a slight increase in delays and queues into the design year. Average delays on all approaches are expected to remain under 10 seconds, representing LOS A for both peak hours. Degree of saturation (vehicle-to-capacity ratio) is expected to remain largely under 1.0 in both peak hours, indicating the intersection is expected to retain adequate capacity through the design year. Capacity analysis results for the intersection are presented in **Table 5.3**.

Table 5.3 – Capacity Analysis Results: 8th Street & Pleasant Street/Walnut Street

8th Street & Pleasant Street Extension/Walnut Street							
Horizon Year	Movement	AM			PM		
		Delay / LOS	V/C Ratio	Queue Length	Delay / LOS	V/C Ratio	Queue Length
Opening Year (2025)	EB Approach	3.4 / A	0.23	25	3.5 / A	0.34	41
	WB Approach	--	0.00	0	--	0.00	0
	NB Approach	5.2 / A	0.28	45	4.8 / A	0.41	82
	SB Approach	3.5 / A	0.16	18	5.4 / A	0.24	34
	Intersection	**4.2 / A**	**0.28**	-	**4.5 / A**	**0.41**	-
Interim Year (2035)	EB Approach	3.6 / A	0.27	31	3.8 / A	0.42	55
	WB Approach	--	0.00	0	--	0.00	0
	NB Approach	5.2 / A	0.32	56	4.8 / A	0.48	108
	SB Approach	3.9 / A	0.20	23	6.7 / A	0.31	48
	Intersection	**4.4 / A**	**0.32**	-	**4.8 / A**	**0.48**	-
Design Year (2045)	EB Approach	3.8 / A	0.33	39	4.5 / A	0.51	80
	WB Approach	--	0.00	0	--	0.00	0
	NB Approach	5.2 / A	0.37	70	4.8 / A	0.55	146
	SB Approach	4.4 / A	0.24	30	9.4 / A	0.41	75
	Intersection	**4.6 / A**	**0.37**	-	**5.5 / A**	**0.55**	-

5.3 8th Street & Pleasant Street

Similar to the proposed roundabout at Pleasant Street Extension/Walnut Street, the traffic flows along this segment of Pleasant Street are projected to result in heavy westbound to northbound and southbound to eastbound traffic flows.

The intersection is expected to operate at LOS A with minor delays and short queues on all approaches during both AM and PM peak hours of the opening year (2025).

Operations are expected to remain virtually unchanged from the opening year despite increasing volumes into the interim year with all intersection approaches expected to remain functioning at LOS A in both peak hours.

In the design year, all approaches would experience slight increases in delay and queueing. Average delays on all approaches are expected to remain under 5 seconds, representing LOS A for both peak hours. Degree of saturation (vehicle-to-capacity ratio) is expected to remain under 1.0 in both peak hours, indicating the intersection retains adequate capacity through the design year. Capacity analysis results for the intersection are presented in **Table 5.4**.

Table 5.4 – Capacity Analysis Results: 8th Street & Pleasant Street

8th Street & Pleasant Street							
Horizon Year	Movement	AM			PM		
		Delay / LOS	V/C Ratio	Queue Length	Delay / LOS	V/C Ratio	Queue Length
Opening Year (2025)	EB Approach	3.0 / A	0.02	2	5.1 / A	0.01	1
	WB Approach	2.4 / A	0.20	22	3.0 / A	0.38	48
	NB Approach	3.0 / A	0.16	19	4.4 / A	0.32	41
	SB Approach	3.1 / A	0.32	54	3.8 / A	0.44	86
	Intersection	**2.9 / A**	**0.32**	-	**3.7 / A**	**0.44**	-
Interim Year (2035)	EB Approach	3.3 / A	0.03	3	5.1 / A	0.01	1
	WB Approach	2.6 / A	0.24	27	3.0 / A	0.38	47
	NB Approach	3.3 / A	0.19	24	3.8 / A	0.32	41
	SB Approach	3.2 / A	0.38	68	4.4 / A	0.44	86
	Intersection	**3.0 / A**	**0.38**	-	**3.7 / A**	**0.44**	-
Design Year (2045)	EB Approach	4.1 / A	0.03	3	6.2 / A	0.02	2
	WB Approach	2.9 / A	0.31	36	3.7 / A	0.47	69
	NB Approach	3.7 / A	0.24	33	6.3 / A	0.46	67
	SB Approach	3.3 / A	0.46	95	4.1 / A	0.56	134
	Intersection	**3.3 / A**	**0.46**	-	**4.5 / A**	**0.56**	-

5.4 10th Street & Pleasant Street

The proposed roundabout is expected to operate with minor delays and queues representative of LOS A on all approaches during both peak hours in the opening year (2025).

In the interim year (2035) the intersection is expected to experience only minor increases in delays and queues as all the approaches retain LOS A during both peak hours.

In the design year (2045) operating conditions are expected to slightly degrade from the interim year conditions as intersection throughput progressively increases. Queues in the northbound approach during the PM peak hour are expected to experience a considerable increase as delays nearly double from the interim year; however, the approach would maintain an acceptable delay representative of LOS B. Degree of saturation (vehicle-to-capacity ratio) is expected to remain under 1.0 through the design year, indicating the intersection is expected to have adequate capacity. Capacity analysis results for the intersection are presented in **Table 5.5**.

Table 5.5 – Capacity Analysis Results: 10th Street & Pleasant Street

10th Street & Pleasant Street							
Horizon Year	Movement	AM			PM		
		Delay / LOS	V/C Ratio	Queue Length	Delay / LOS	V/C Ratio	Queue Length
Opening Year (2025)	EB Approach	1.4 / A	0.15	18	1.7 / A	0.32	55
	WB Approach	1.3 / A	0.15	19	2.4 / A	0.32	58
	NB Approach	3.2 / A	0.28	29	4.3 / A	0.58	87
	SB Approach	2.6 / A	0.28	29	2.9 / A	0.33	37
	Intersection	**2.1 / A**	**0.28**	-	**2.6 / A**	**0.58**	-
Interim Year (2035)	EB Approach	1.6 / A	0.18	23	2.0 / A	0.39	73
	WB Approach	1.6 / A	0.19	24	2.9 / A	0.40	81
	NB Approach	3.5 / A	0.33	37	6.0 / A	0.72	134
	SB Approach	2.8 / A	0.34	37	3.4 / A	0.41	52
	Intersection	**2.3 / A**	**0.34**	-	**3.4 / A**	**0.72**	-
Design Year (2045)	EB Approach	1.9 / A	0.22	30	2.5 / A	0.47	99
	WB Approach	1.8 / A	0.23	31	4.1 / A	0.51	123
	NB Approach	3.7 / A	0.40	47	13.6 / B	0.92	284
	SB Approach	3.3 / A	0.41	49	4.4 / A	0.00	79
	Intersection	**2.6 / A**	**0.41**	-	**5.7 / A**	**0.92**	-

6.0 Findings and Recommendations

The purpose of this report is to develop an update for roundabout analysis of the four (4) new intersections that would be encompassed in the Pleasant Street Extension project. Analysis at these intersections was previously carried out as part of the *SR 32 and Pleasant Street Corridor Study* (2018). This report used updated values to reflect more current annual growth factors and projected traffic patterns.

The intersection turning movement volumes that were determined from previous studies were updated to reflect an area-wide average annual growth rate of 1.50% based on the regional travel demand model projections. Turning movement count volumes were also updated to reflect the estimated traffic in the area rerouting to the Pleasant Street Extension. Consequently, traffic volume sets for opening, interim and design year scenarios were developed to analyze the performance of the proposed roundabout intersections.

Capacity analysis was updated using the AM and PM peak hour volume sets for each of the three horizon year scenarios. Capacity analysis was used to analyze and select optimum roundabout lane configurations based on the estimated volumes. This was an iterative process that started with single-lane roundabouts at each intersection and additional lanes were introduced where necessary to effectively meet projected demand.

The recommended roundabout configurations are intended to minimize the need for lane changes between the three roundabouts in close range of each other at the intersections of Pleasant Street with 8th Street/Walnut Street, 8th Street, and 10th Street. To further discourage lane changes in segments in between the roundabouts, it is also recommended to include guide signs/pavement markings for drivers to enter the appropriate lane to reach their intended destination in advance of the roundabouts.

These configurations are expected to operate efficiently with an acceptable level of service for all the intersections through the design year. The roundabouts are expected to experience manageable queues at the approaches, particularly those approaches where the close proximity of the adjacent roundabout intersections requires avoiding long queues in order for the network to operate efficiently.

The City of Noblesville requested that the growth rate of 2.0% annual growth be used to conservatively estimate turning movement count volumes for future-year peak hour scenarios. The resulting volumes were then used to perform capacity analysis and determine whether the roundabout configurations that were previously determined would be sufficient to accommodate the additional traffic. The capacity analysis determined that the additional traffic would overload approaches at the River Road and 10th Street roundabouts. Therefore, the resulting changes in roundabout configurations were as follows:

- River Road: Add a westbound right-turn bypass (east approach on Pleasant Street Extension)
- 10th Street: Add 2nd entry lane on south approach of 10th Street. The new configuration of the approach consists of one shared left/through lane, and one right-turn pocket lane.

Thes additional improvements to the roundabout configurations enable the roundabout intersections along the corridor to operate efficiently with the updated traffic volume projection.

Appendix A – Traffic Data

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & 10th Street
DATE : 9/12/2017
COUNTED BY : Miovision

	TOTAL VEHICLES (PASSENGER CARS + TRUCKS)											
	AM PEAK HOUR VOLUMES BEGINS 7:30 AM				OFF PEAK HOUR VOLUMES BEGINS				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	3	225	28	**256**					7	375	87	**469**
SOUTHBOUND	38	233	3	**274**					67	300	13	**380**
EASTBOUND	0	161	22	**183**					0	352	35	**387**
WESTBOUND	3	133	40	**176**					2	241	135	**378**

	PEAK HOUR FACTOR					
	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.77	0.91			0.98	0.98
SOUTHBOUND	0.87				0.90	
EASTBOUND	0.86				0.93	
WESTBOUND	0.88				0.97	

	TRUCK PERCENTAGE											
	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	0.0%	2.2%	0.0%	2.0%					14.3%	0.3%	1.1%	0.6%
SOUTHBOUND	2.6%	2.6%	0.0%	2.6%					0.0%	1.3%	0.0%	1.1%
EASTBOUND	0.0%	4.3%	4.5%	4.4%					0.0%	0.9%	0.0%	0.8%
WESTBOUND	0.0%	7.5%	5.0%	6.8%					0.0%	1.7%	0.0%	1.1%

HOURLY SUMMARY								
HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	65	86	151	37	32	69	220
7:00 AM	TO	8:00 AM	248	279	527	152	158	310	837
8:00 AM	TO	9:00 AM	123	129	252	99	80	179	431
4:00 PM	TO	5:00 PM	230	180	410	195	187	382	792
5:00 PM	TO	6:00 PM	449	342	791	354	362	716	1507
6:00 PM	TO	7:00 PM	187	141	328	153	156	309	637
TOTAL VOLUME			1302	1157	2459	990	975	1965	4424
PERCENTAGE			29.4%	26.2%	55.6%	22.4%	22.0%	44.4%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & 10th Street
DATE : 9/12/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	1	1	2	57	3	60	3	0	3	61	4	65
7:00 AM - 8:00 AM	4	0	4	211	13	224	20	0	20	235	13	248
8:00 AM - 9:00 AM	2	0	2	102	2	104	17	0	17	121	2	123
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	2	0	2	189	1	190	38	0	38	229	1	230
5:00 PM - 6:00 PM	12	1	13	355	0	355	80	1	81	447	2	449
6:00 PM - 7:00 PM	10	0	10	157	0	157	20	0	20	187	0	187
PASSENGER	31			1071			178			1280		
	93.9%			98.3%			99.4%			98.3%		
TRUCK	2			19			1			22		
	6.1%			1.7%			0.6%			1.7%		
BOTH	33			1090			179			1302		
	2.5%			83.7%			13.7%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	7	1	8	73	4	77	1	0	1	81	5	86
7:00 AM - 8:00 AM	32	2	34	235	4	239	5	1	6	272	7	279
8:00 AM - 9:00 AM	16	0	16	109	3	112	1	0	1	126	3	129
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	36	0	36	136	2	138	6	0	6	178	2	180
5:00 PM - 6:00 PM	62	0	62	262	3	265	15	0	15	339	3	342
6:00 PM - 7:00 PM	33	0	33	102	2	104	4	0	4	139	2	141
PASSENGER	186			917			32			1135		
	98.4%			98.1%			97.0%			98.1%		
TRUCK	3			18			1			22		
	1.6%			1.9%			3.0%			1.9%		
BOTH	189			935			33			1157		
	16.3%			80.8%			2.9%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	0	0	0	33	2	35	2	0	2	35	2	37
7:00 AM - 8:00 AM	0	0	0	132	8	140	12	0	12	144	8	152
8:00 AM - 9:00 AM	0	0	0	82	3	85	13	1	14	95	4	99
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	0	0	0	171	2	173	22	0	22	193	2	195
5:00 PM - 6:00 PM	0	0	0	324	3	327	27	0	27	351	3	354
6:00 PM - 7:00 PM	1	0	1	141	1	142	10	0	10	152	1	153
PASSENGER	1			883			86			970		
	100.0%			97.9%			98.9%			98.0%		
TRUCK	0			19			1			20		
	0.0%			2.1%			1.1%			2.0%		
BOTH	1			902			87			990		
	0.1%			91.1%			8.8%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	1	0	1	21	0	21	10	0	10	32	0	32
7:00 AM - 8:00 AM	1	0	1	112	7	119	37	1	38	150	8	158
8:00 AM - 9:00 AM	2	0	2	54	6	60	17	1	18	73	7	80
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	1	0	1	108	3	111	75	0	75	184	3	187
5:00 PM - 6:00 PM	3	0	3	254	1	255	104	0	104	361	1	362
6:00 PM - 7:00 PM	0	0	0	120	0	120	36	0	36	156	0	156
PASSENGER	8			669			279			956		
	100.0%			97.5%			99.3%			98.1%		
TRUCK	0			17			2			19		
	0.0%			2.5%			0.7%			1.9%		
BOTH	8			686			281			975		
	0.8%			70.4%			28.8%			100.0%		

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & 8th Street
DATE : 9/12/2017
COUNTED BY : Miovision

	TOTAL VEHICLES (PASSENGER CARS + TRUCKS)											
	AM PEAK HOUR VOLUMES BEGINS 7:15 AM				OFF PEAK HOUR VOLUMES BEGINS				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	1	264	13	**278**					9	398	35	**442**
SOUTHBOUND	126	442	8	**576**					309	471	5	**785**
EASTBOUND	1	9	6	**16**					2	1	4	**7**
WESTBOUND	13	14	82	**109**					10	5	162	**177**

	PEAK HOUR FACTOR					
	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.94	0.96			0.94	0.94
SOUTHBOUND	0.93				0.96	
EASTBOUND	0.57				0.58	
WESTBOUND	0.88				0.85	

	TRUCK PERCENTAGE											
	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	0.0%	4.9%	38.5%	6.5%					0.0%	1.0%	0.0%	0.9%
SOUTHBOUND	1.6%	2.9%	12.5%	2.8%					1.3%	1.3%	0.0%	1.3%
EASTBOUND	0.0%	11.1%	0.0%	6.3%					0.0%	0.0%	0.0%	0.0%
WESTBOUND	46.2%	14.3%	2.4%	9.2%					30.0%	20.0%	0.6%	2.8%

HOURLY SUMMARY								
HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	122	210	332	0	21	21	353
7:00 AM	TO	8:00 AM	280	554	834	14	100	114	948
8:00 AM	TO	9:00 AM	149	278	427	7	50	57	484
4:00 PM	TO	5:00 PM	231	391	622	2	78	80	702
5:00 PM	TO	6:00 PM	399	750	1149	17	207	224	1373
6:00 PM	TO	7:00 PM	148	300	448	6	107	113	561
TOTAL VOLUME			1329	2483	3812	46	563	609	4421
PERCENTAGE			30.1%	56.2%	86.2%	1.0%	12.7%	13.8%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & 8th Street
DATE : 9/12/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	2	0	2	115	3	118	0	2	2	117	5	122
7:00 AM - 8:00 AM	1	0	1	256	11	267	6	6	12	263	17	280
8:00 AM - 9:00 AM	2	0	2	132	10	142	4	1	5	138	11	149
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	5	0	5	201	3	204	22	0	22	228	3	231
5:00 PM - 6:00 PM	11	0	11	370	2	372	16	0	16	397	2	399
6:00 PM - 7:00 PM	3	0	3	137	4	141	4	0	4	144	4	148
PASSENGER	24			1211			52			1287		
	100.0%			97.3%			85.2%			96.8%		
TRUCK	0			33			9			42		
	0.0%			2.7%			14.8%			3.2%		
BOTH	24			1244			61			1329		
	1.8%			93.6%			4.6%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	33	0	33	175	1	176	1	0	1	209	1	210
7:00 AM - 8:00 AM	120	3	123	415	10	425	5	1	6	540	14	554
8:00 AM - 9:00 AM	74	2	76	194	5	199	3	0	3	271	7	278
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	152	2	154	229	5	234	3	0	3	384	7	391
5:00 PM - 6:00 PM	288	3	291	450	3	453	6	0	6	744	6	750
6:00 PM - 7:00 PM	128	2	130	164	4	168	2	0	2	294	6	300
PASSENGER	795			1627			20			2442		
	98.5%			98.3%			95.2%			98.3%		
TRUCK	12			28			1			41		
	1.5%			1.7%			4.8%			1.7%		
BOTH	807			1655			21			2483		
	32.5%			66.7%			0.8%			100.0%		

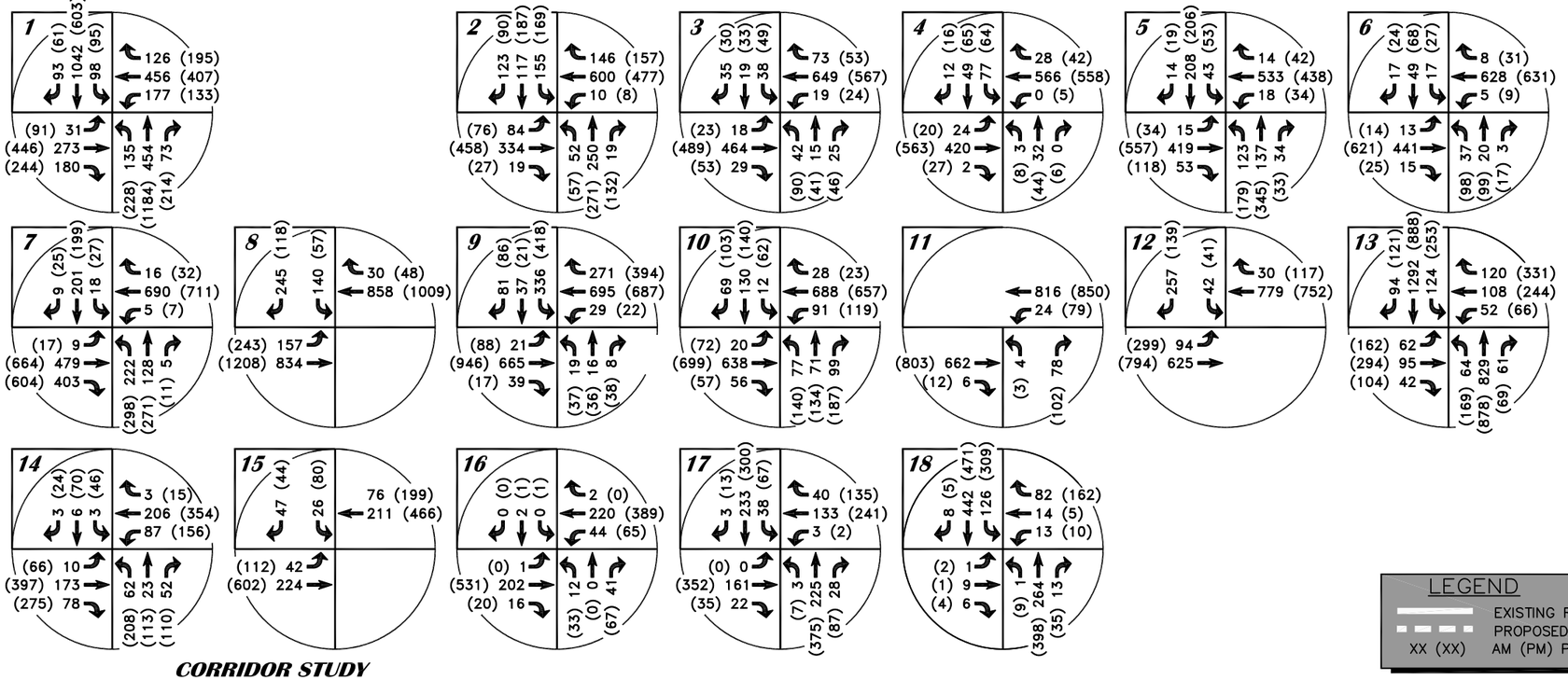
DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM - 8:00 AM	1	0	1	8	0	8	5	0	5	14	0	14
8:00 AM - 9:00 AM	0	0	0	1	1	2	5	0	5	6	1	7
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	1	0	1	0	0	0	1	0	1	2	0	2
5:00 PM - 6:00 PM	3	0	3	10	0	10	4	0	4	17	0	17
6:00 PM - 7:00 PM	2	0	2	3	0	3	0	1	1	5	1	6
PASSENGER	7			22			15			44		
	100.0%			95.7%			93.8%			95.7%		
TRUCK	0			1			1			2		
	0.0%			4.3%			6.3%			4.3%		
BOTH	7			23			16			46		
	15.2%			50.0%			34.8%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	6	0	6	3	0	3	11	1	12	20	1	21
7:00 AM - 8:00 AM	8	6	14	11	1	12	73	1	74	92	8	100
8:00 AM - 9:00 AM	2	2	4	4	1	5	37	4	41	43	7	50
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	4	2	6	3	1	4	68	0	68	75	3	78
5:00 PM - 6:00 PM	3	1	4	9	0	9	193	1	194	205	2	207
6:00 PM - 7:00 PM	2	0	2	9	0	9	96	0	96	107	0	107
PASSENGER	25			39			478			542		
	69.4%			92.9%			98.6%			96.3%		
TRUCK	11			3			7			21		
	30.6%			7.1%			1.4%			3.7%		
BOTH	36			42			485			563		
	6.4%			7.5%			86.1%			100.0%		

Release 11-18-04



LEGEND

EXISTING ROADWAY

PROPOSED ROADWAY

XX (XX) AM (PM) PEAK HOUR

FIGURE 1

EXISTING TRAFFIC VOLUMES

CORRIDOR STUDY

PLEASANT STREET EXTENSION - NOBLESVILLE, IN

Z:\2017\170685 Noblesville, Traffic, Pleasant St. Bridge\Updated 2018\Pleasant Street Corridor.dwg 1=20 4-11-18 DQ

Z:\2017\170685 Noblesville, Traffic, Pleasant St. Bridge\Updated 2018\Pleasant Street Corridor.dwg 1=20 4-11-18 DQ

CORRIDOR STUDY
PLEASANT STREET EXTENSION - NOBLESVILLE, IN

FIGURE 2

YEAR 2045 BACKGROUND TRAFFIC VOLUMES

Z:\2017\170685 Noblesville, Traffic, Pleasant St. Bridge\Updated 2018\Pleasant Street Corridor.dwg 1=20 4-11-18 DQ

CORRIDOR STUDY
PLEASANT STREET EXTENSION - NOBLESVILLE, IN

FIGURE 3

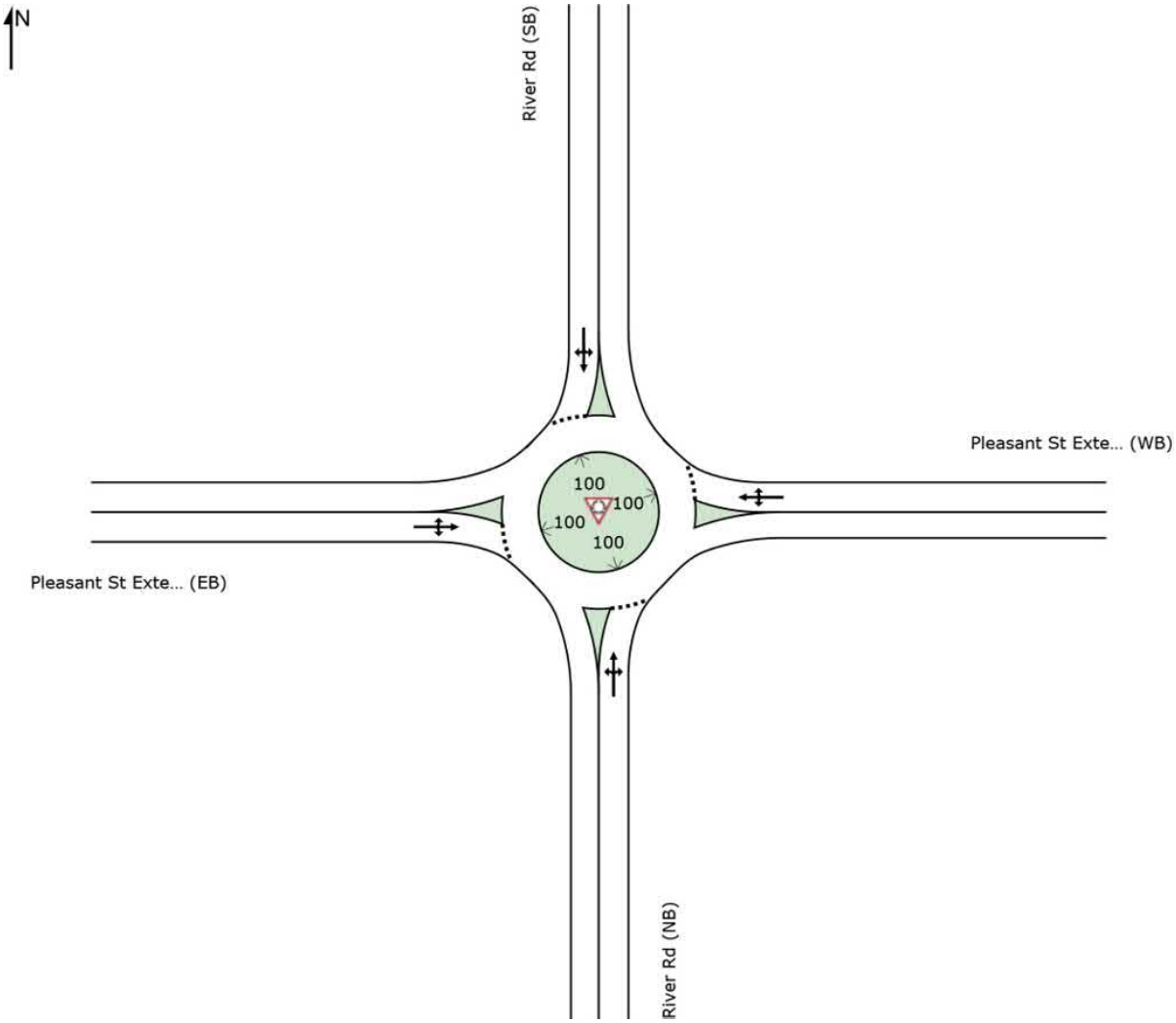
RE-ASSIGNED YEAR 2045 TRAFFIC VOLUMES

Appendix B – Capacity Analysis Output Reports

SITE LAYOUT

Site: [Pleasant St Extension & River Rd - AM 2025]

Opening Year 2025
AM Peak Hour
Environmental Factor = 1.1
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:31:04 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension & River Rd - AM 2025]

Opening Year 2025
AM Peak Hour
Environmental Factor = 1.1
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: River Rd (NB)												
3	L2	69	20.8	0.228	9.5	LOS A	1.2	34.4	0.54	0.59	0.54	29.9
8	T1	88	11.3	0.228	3.4	LOS A	1.2	34.4	0.54	0.59	0.54	29.6
18	R2	60	13.1	0.228	6.0	LOS A	1.2	34.4	0.54	0.59	0.54	31.6
Approach		217	14.8	0.228	6.0	LOS A	1.2	34.4	0.54	0.59	0.54	30.2
East: Pleasant St Extension (WB)												
1	L2	50	4.4	0.289	10.6	LOS B	1.7	44.3	0.40	0.52	0.40	36.5
6	T1	167	5.8	0.289	4.6	LOS A	1.7	44.3	0.40	0.52	0.40	36.4
16	R2	138	3.6	0.289	4.7	LOS A	1.7	44.3	0.40	0.52	0.40	35.3
Approach		355	4.7	0.289	5.5	LOS A	1.7	44.3	0.40	0.52	0.40	36.0
North: River Rd (SB)												
7	L2	60	3.0	0.195	11.0	LOS B	1.0	26.3	0.45	0.47	0.45	33.1
4	T1	157	6.2	0.195	2.8	LOS A	1.0	26.3	0.45	0.47	0.45	29.8
14	R2	4	2.9	0.195	3.4	LOS A	1.0	26.3	0.45	0.47	0.45	29.0
Approach		221	5.3	0.195	5.0	LOS A	1.0	26.3	0.45	0.47	0.45	30.6
West: Pleasant St Extension (EB)												
5	L2	4	3.0	0.333	8.5	LOS A	2.0	51.2	0.48	0.52	0.48	32.5
2	T1	317	3.6	0.333	5.1	LOS A	2.0	51.2	0.48	0.52	0.48	35.8
12	R2	60	17.9	0.333	3.9	LOS A	2.0	51.2	0.48	0.52	0.48	31.0
Approach		381	5.8	0.333	4.9	LOS A	2.0	51.2	0.48	0.52	0.48	34.9
All Vehicles		1174	7.1	0.333	5.3	LOS A	2.0	51.2	0.46	0.52	0.46	33.3

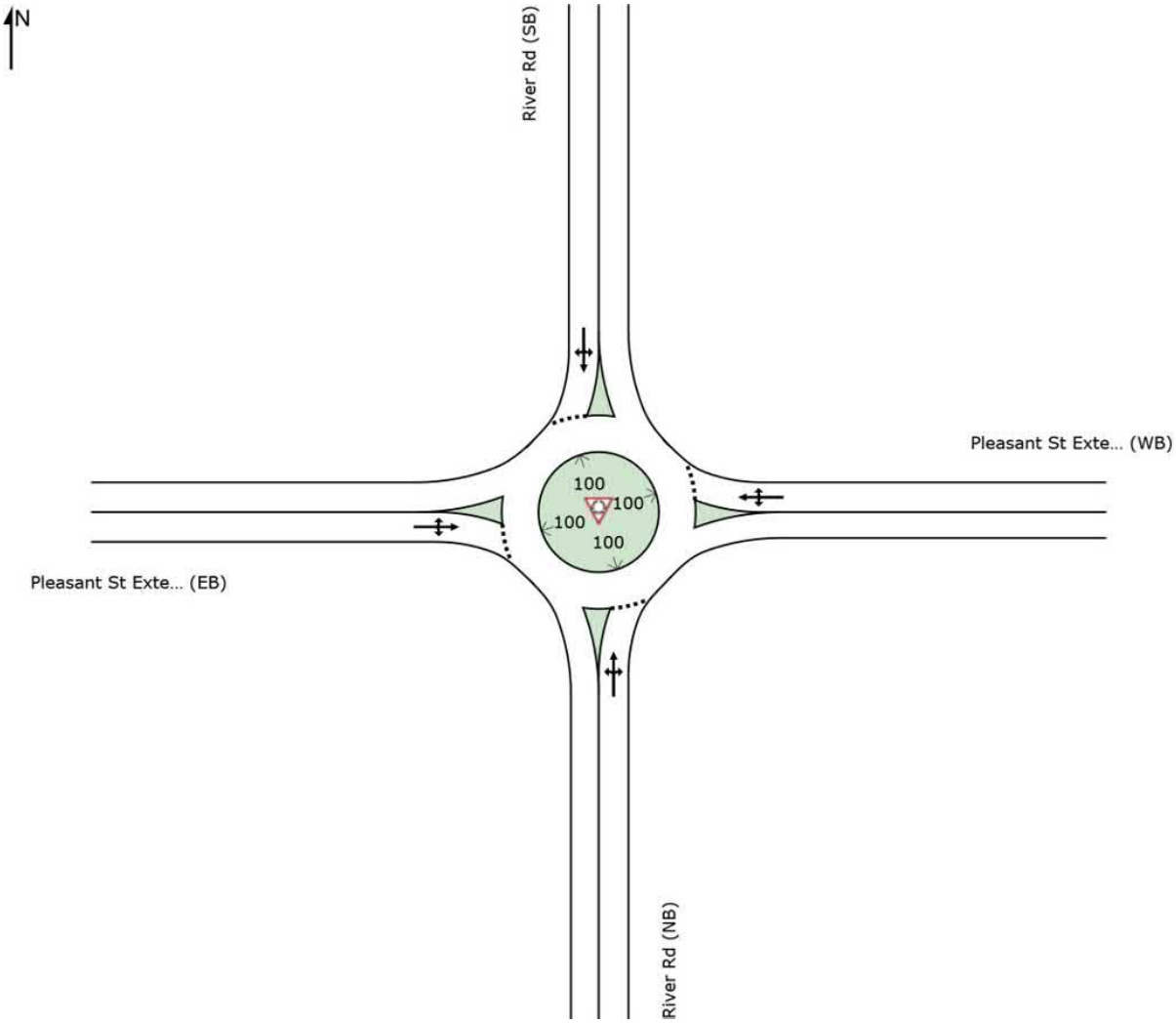
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Thursday, April 23, 2020 7:27:04 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

SITE LAYOUT

Site: [Pleasant St Extension & River Rd - PM 2025]

Opening Year 2025
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:31:06 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension & River Rd - PM 2025]

Opening Year 2025
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: River Rd (NB)												
3	L2	121	5.7	0.439	10.0	LOS B	3.0	76.6	0.69	0.66	0.69	29.3
8	T1	242	5.2	0.439	4.3	LOS A	3.0	76.6	0.69	0.66	0.69	29.0
18	R2	71	2.1	0.439	6.6	LOS A	3.0	76.6	0.69	0.66	0.69	31.1
Approach		434	4.8	0.439	6.3	LOS A	3.0	76.6	0.69	0.66	0.69	29.4
East: Pleasant St Extension (WB)												
1	L2	29	3.4	0.519	12.2	LOS B	4.0	103.7	0.70	0.68	0.71	35.8
6	T1	252	2.4	0.519	6.1	LOS A	4.0	103.7	0.70	0.68	0.71	35.8
16	R2	273	4.3	0.519	6.3	LOS A	4.0	103.7	0.70	0.68	0.71	34.7
Approach		554	3.4	0.519	6.5	LOS A	4.0	103.7	0.70	0.68	0.71	35.2
North: River Rd (SB)												
7	L2	121	3.0	0.284	11.7	LOS B	1.7	44.1	0.57	0.59	0.57	32.9
4	T1	171	7.1	0.284	3.5	LOS A	1.7	44.1	0.57	0.59	0.57	29.7
14	R2	4	3.0	0.284	4.0	LOS A	1.7	44.1	0.57	0.59	0.57	28.9
Approach		296	5.4	0.284	6.8	LOS A	1.7	44.1	0.57	0.59	0.57	30.9
West: Pleasant St Extension (EB)												
5	L2	4	3.0	0.387	8.8	LOS A	2.5	64.9	0.57	0.56	0.57	32.3
2	T1	363	2.7	0.387	5.4	LOS A	2.5	64.9	0.57	0.56	0.57	35.5
12	R2	61	15.8	0.387	4.3	LOS A	2.5	64.9	0.57	0.56	0.57	30.8
Approach		428	4.6	0.387	5.3	LOS A	2.5	64.9	0.57	0.56	0.57	34.8
All Vehicles		1712	4.4	0.519	6.2	LOS A	4.0	103.7	0.64	0.63	0.65	32.7

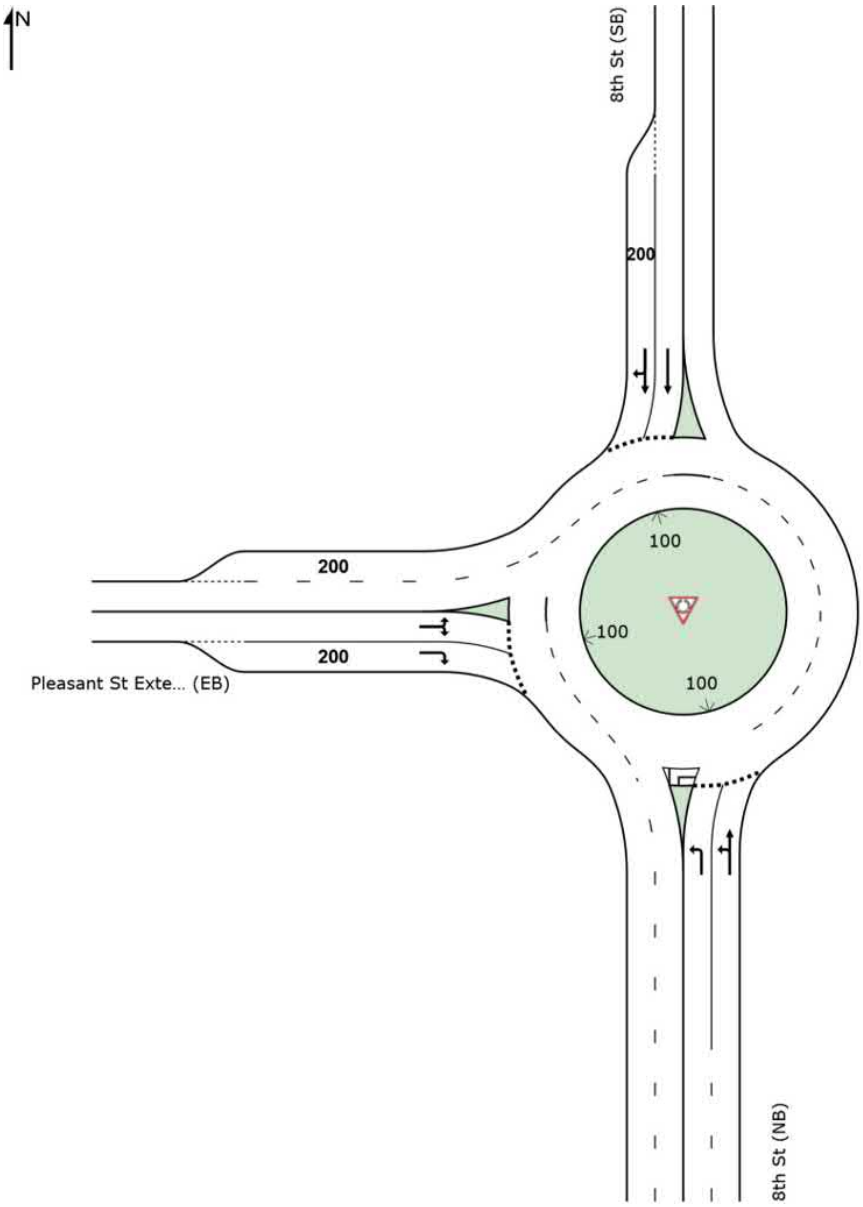
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Thursday, April 23, 2020 7:27:14 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

SITE LAYOUT

Site: [Pleasant St Extension/Walnut & 8th St - AM 2025]

Opening Year 2025
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:10:01 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension/Walnut & 8th St - AM 2025]

Opening Year 2025
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	492	2.0	0.275	7.1	LOS A	1.8	44.7	0.04	0.57	0.04	28.3
8	T1	243	2.0	0.174	1.3	LOS A	1.0	24.9	0.04	0.18	0.04	30.9
Approach		734	2.0	0.275	5.2	LOS A	1.8	44.7	0.04	0.44	0.04	29.1
North: 8th St (SB)												
4	T1	348	2.0	0.161	3.5	LOS A	0.7	18.0	0.45	0.42	0.45	29.0
14	R2	9	3.0	0.161	4.0	LOS A	0.7	18.0	0.45	0.41	0.45	28.5
Approach		357	2.0	0.161	3.5	LOS A	0.7	18.0	0.45	0.42	0.45	29.0
West: Pleasant St Extension (EB)												
5	L2	4	0.0	0.226	8.0	LOS A	0.9	24.1	0.40	0.49	0.40	30.1
12	R2	496	11.0	0.226	3.4	LOS A	0.9	24.6	0.39	0.48	0.39	28.0
Approach		500	10.9	0.226	3.4	LOS A	0.9	24.6	0.39	0.48	0.39	28.0
All Vehicles		1592	4.8	0.275	4.2	LOS A	1.8	44.7	0.24	0.45	0.24	28.7

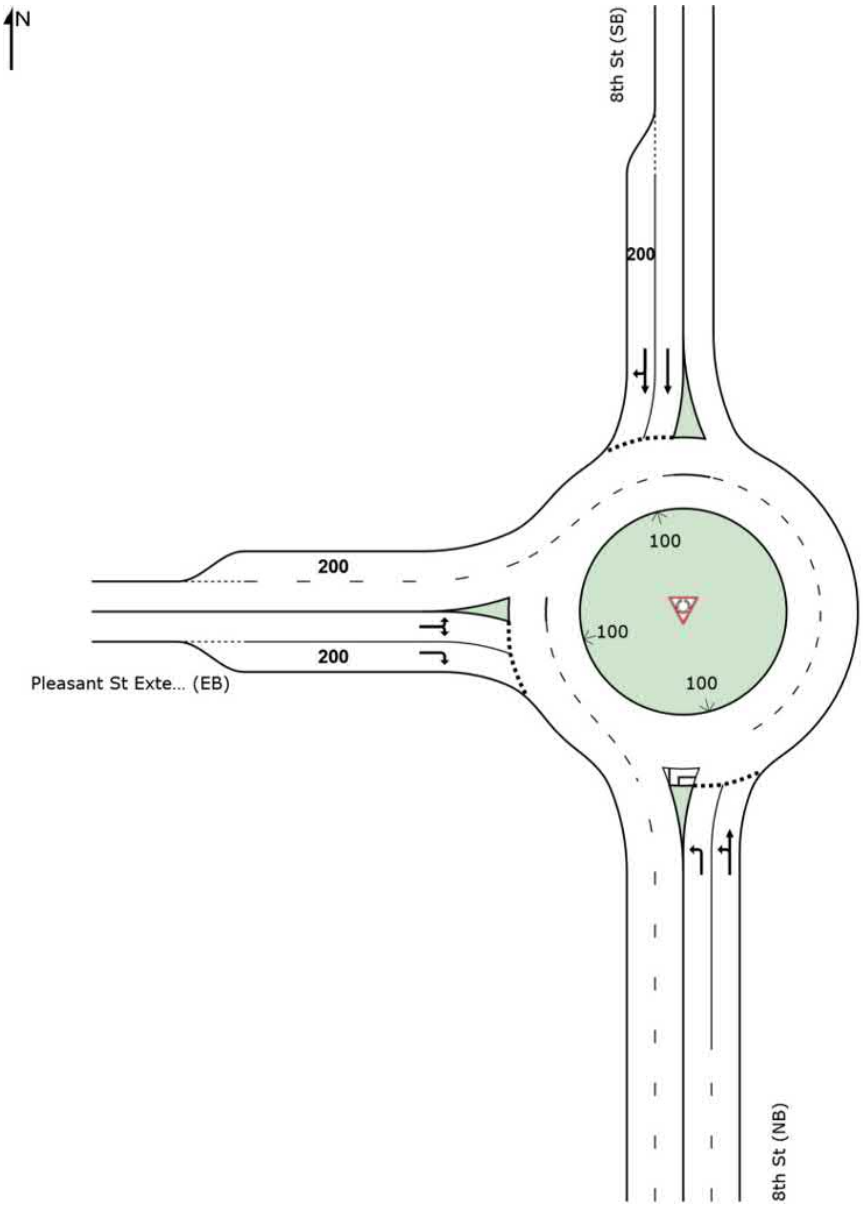
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Tuesday, April 07, 2020 11:21:55 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

SITE LAYOUT

Site: [Pleasant St Extension/Walnut & 8th St - PM 2025]

Opening Year 2025
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:10:17 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension/Walnut & 8th St - PM 2025]

Opening Year 2025
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	710	3.0	0.408	7.1	LOS A	3.2	81.9	0.06	0.57	0.06	28.2
8	T1	475	3.0	0.325	1.3	LOS A	2.2	57.4	0.06	0.16	0.06	31.0
Approach		1185	3.0	0.408	4.8	LOS A	3.2	81.9	0.06	0.40	0.06	29.2
North: 8th St (SB)												
4	T1	437	3.0	0.242	5.4	LOS A	1.3	33.9	0.63	0.63	0.63	28.4
14	R2	10	3.0	0.242	5.8	LOS A	1.3	33.9	0.62	0.61	0.62	28.0
Approach		447	3.0	0.242	5.4	LOS A	1.3	33.9	0.63	0.63	0.63	28.4
West: Pleasant St Extension (EB)												
5	L2	4	3.0	0.344	8.4	LOS A	1.6	40.2	0.49	0.52	0.49	29.9
12	R2	782	3.0	0.344	3.5	LOS A	1.6	41.4	0.48	0.50	0.48	27.8
Approach		786	3.0	0.344	3.5	LOS A	1.6	41.4	0.48	0.50	0.48	27.8
All Vehicles		2417	3.0	0.408	4.5	LOS A	3.2	81.9	0.30	0.48	0.30	28.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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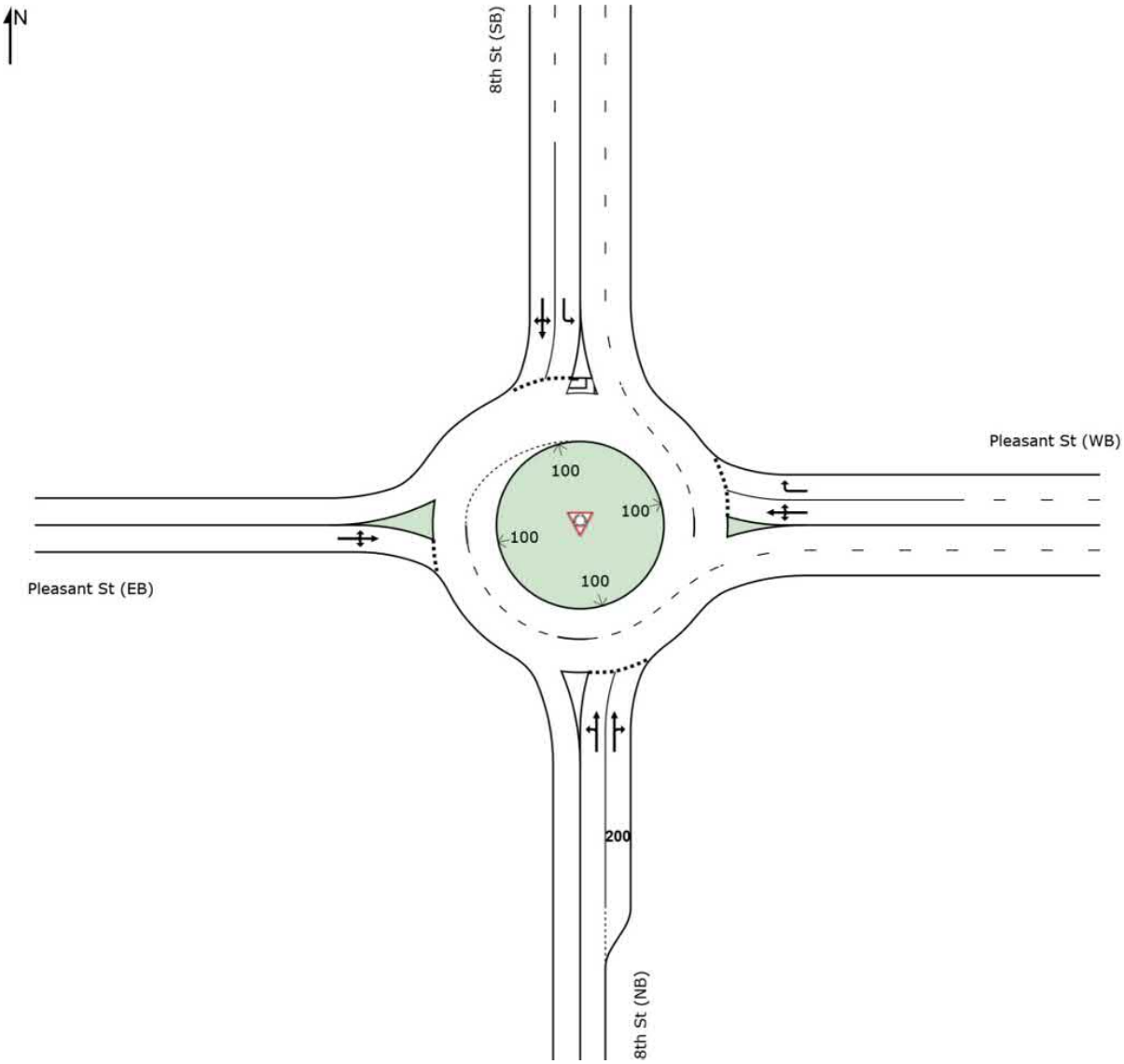
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

SITE LAYOUT

Site: [Pleasant St & 8th St - AM 2025]

Opening Year 2025
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:10:04 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

MOVEMENT SUMMARY

Site: [Pleasant St & 8th St - AM 2025]

Opening Year 2025
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	1	0.0	0.156	6.4	LOS A	0.7	17.8	0.40	0.36	0.40	27.9
8	T1	319	5.0	0.156	3.0	LOS A	0.7	18.7	0.40	0.36	0.40	29.0
18	R2	28	39.0	0.156	3.2	LOS A	0.7	18.7	0.40	0.36	0.40	26.7
Approach		348	7.7	0.156	3.0	LOS A	0.7	18.7	0.40	0.36	0.40	28.8
East: Pleasant St (WB)												
1	L2	28	46.0	0.198	7.5	LOS A	0.8	21.8	0.41	0.42	0.41	28.6
6	T1	17	14.0	0.198	1.3	LOS A	0.8	21.8	0.41	0.42	0.41	23.7
16	R2	415	2.0	0.198	2.1	LOS A	0.8	21.2	0.39	0.37	0.39	24.8
Approach		459	5.1	0.198	2.4	LOS A	0.8	21.8	0.39	0.38	0.39	25.1
North: 8th St (SB)												
7	L2	308	2.0	0.223	5.6	LOS A	1.3	32.9	0.22	0.49	0.22	24.7
4	T1	535	3.0	0.321	1.7	LOS A	2.1	54.3	0.22	0.21	0.22	30.2
14	R2	1	13.0	0.321	1.4	LOS A	2.1	54.3	0.22	0.21	0.22	25.5
Approach		845	2.6	0.321	3.1	LOS A	2.1	54.3	0.22	0.31	0.22	28.6
West: Pleasant St (EB)												
5	L2	1	0.0	0.022	7.2	LOS A	0.1	2.0	0.49	0.42	0.49	26.1
2	T1	10	11.0	0.022	2.6	LOS A	0.1	2.0	0.49	0.42	0.49	25.1
12	R2	7	0.0	0.022	2.9	LOS A	0.1	2.0	0.49	0.42	0.49	26.3
Approach		19	6.1	0.022	3.0	LOS A	0.1	2.0	0.49	0.42	0.49	25.7
All Vehicles		1671	4.4	0.321	2.9	LOS A	2.1	54.3	0.31	0.34	0.31	27.9

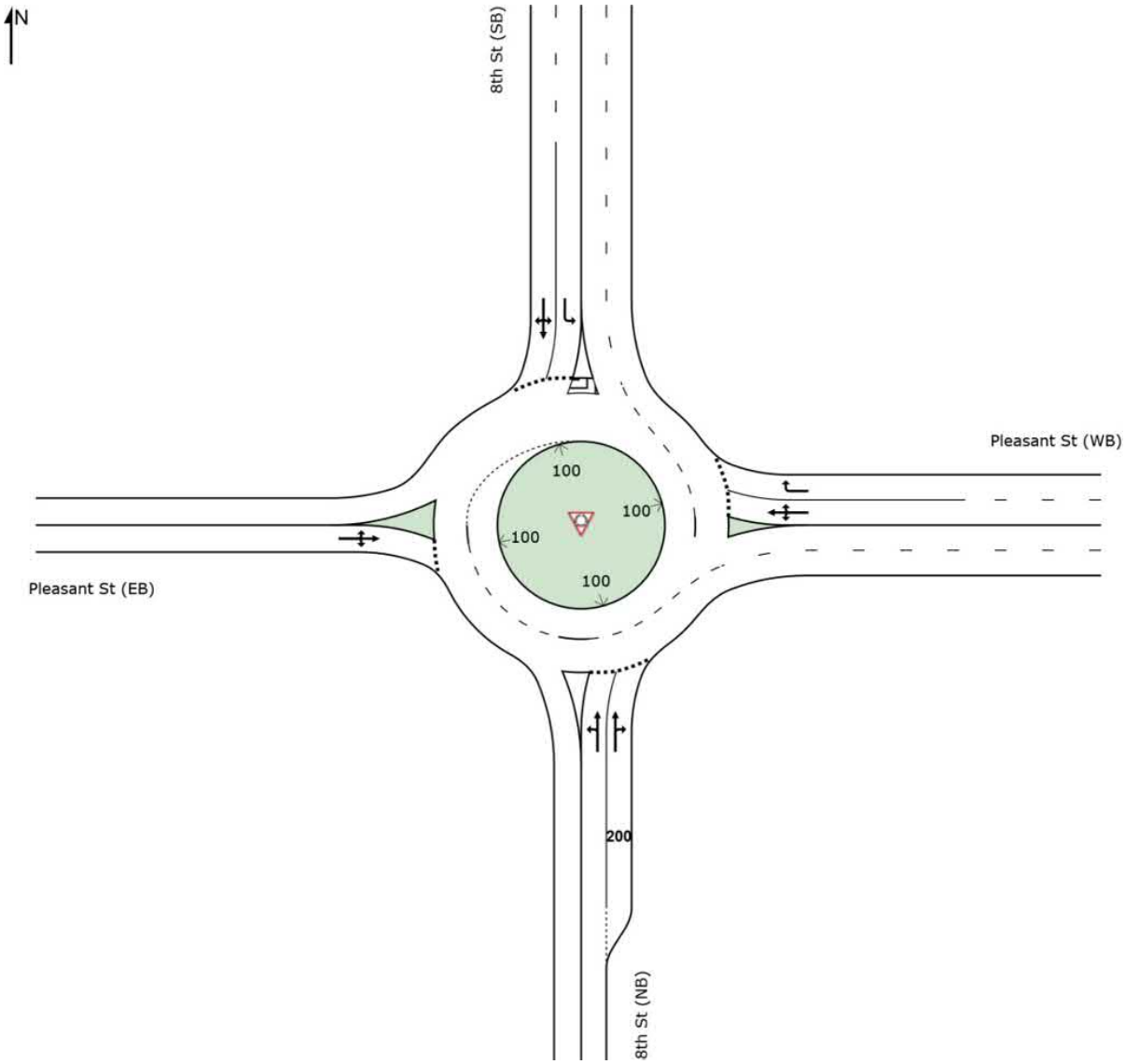
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Tuesday, April 07, 2020 11:21:54 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

SITE LAYOUT

Site: [Pleasant St & 8th St - PM 2025]

Opening Year 2025
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:10:06 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

MOVEMENT SUMMARY

Site: [Pleasant St & 8th St - PM 2025]

Opening Year 2025
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	13	0.0	0.322	8.1	LOS A	1.5	38.6	0.61	0.57	0.61	27.3
8	T1	584	1.0	0.322	4.4	LOS A	1.6	40.7	0.61	0.54	0.61	28.2
18	R2	34	0.0	0.322	3.7	LOS A	1.6	40.7	0.60	0.51	0.60	26.2
Approach		631	0.9	0.322	4.4	LOS A	1.6	40.7	0.61	0.54	0.61	28.0
East: Pleasant St (WB)												
1	L2	23	30.0	0.375	8.5	LOS A	1.8	45.8	0.59	0.56	0.59	28.3
6	T1	7	20.0	0.375	2.7	LOS A	1.8	45.8	0.59	0.56	0.59	23.4
16	R2	749	1.0	0.375	2.9	LOS A	1.9	47.4	0.58	0.50	0.58	24.1
Approach		780	2.1	0.375	3.0	LOS A	1.9	47.4	0.58	0.50	0.58	24.3
North: 8th St (SB)												
7	L2	759	1.0	0.438	5.6	LOS A	3.4	85.8	0.25	0.46	0.25	25.2
4	T1	627	1.0	0.438	1.7	LOS A	3.4	85.8	0.23	0.28	0.23	29.6
14	R2	3	0.0	0.438	1.3	LOS A	3.4	85.8	0.23	0.28	0.23	25.1
Approach		1388	1.0	0.438	3.8	LOS A	3.4	85.8	0.24	0.37	0.24	27.6
West: Pleasant St (EB)												
5	L2	3	0.0	0.012	8.0	LOS A	0.0	1.1	0.59	0.59	0.59	25.4
2	T1	1	0.0	0.012	3.1	LOS A	0.0	1.1	0.59	0.59	0.59	24.5
12	R2	5	0.0	0.012	3.8	LOS A	0.0	1.1	0.59	0.59	0.59	25.8
Approach		10	0.0	0.012	5.1	LOS A	0.0	1.1	0.59	0.59	0.59	25.6
All Vehicles		2809	1.3	0.438	3.7	LOS A	3.4	85.8	0.42	0.45	0.42	27.0

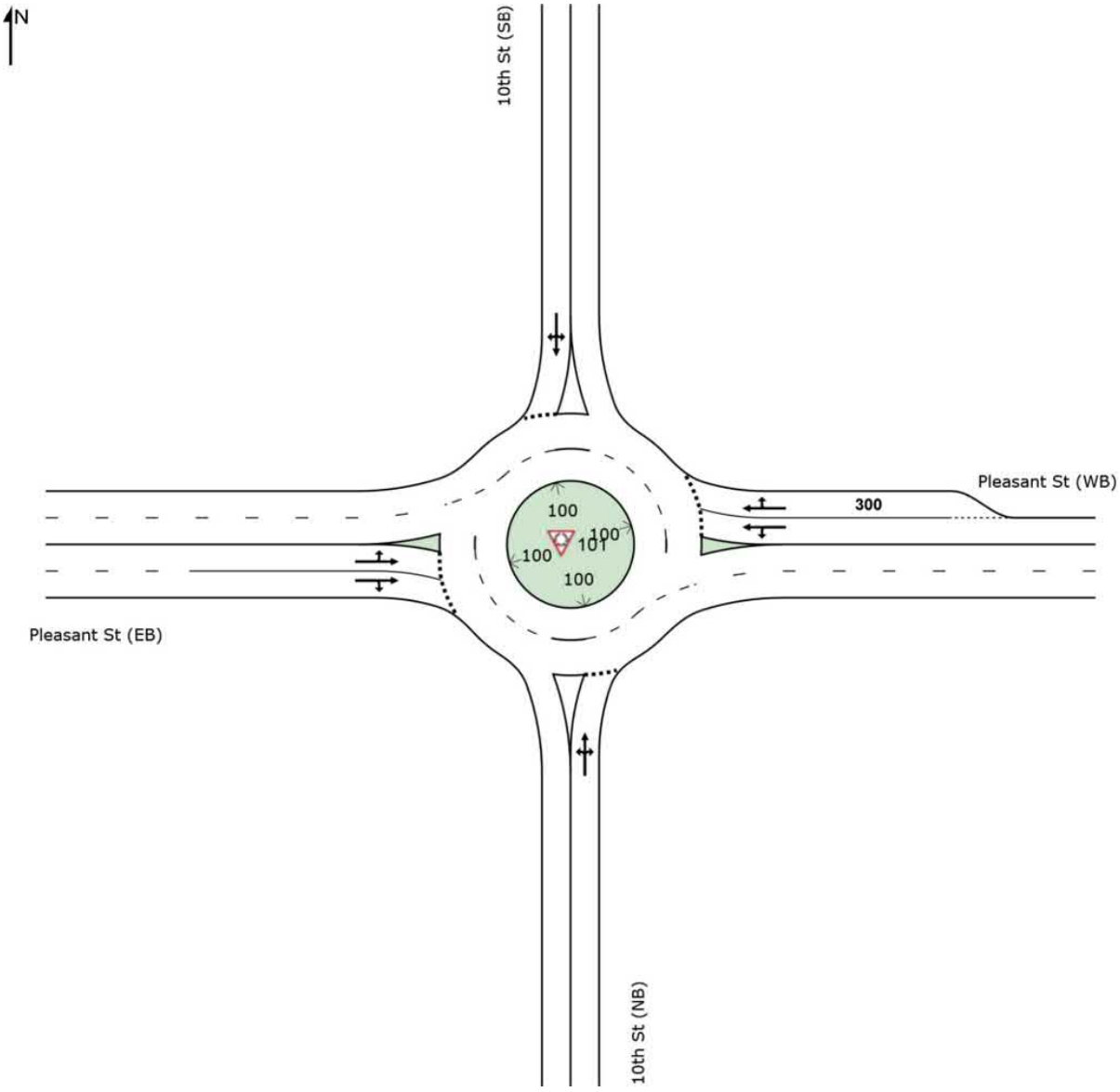
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Tuesday, April 07, 2020 11:21:54 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

SITE LAYOUT

Site: 101 [Pleasant St & 10th St - AM 2025]

Opening Year 2025
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:10:13 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

MOVEMENT SUMMARY

Site: 101 [Pleasant St & 10th St - AM 2025]

Opening Year 2025
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 10th St (NB)												
3	L2	110	3.0	0.279	6.4	LOS A	1.1	29.1	0.40	0.40	0.40	25.8
8	T1	153	2.2	0.279	1.3	LOS A	1.1	29.1	0.40	0.40	0.40	25.0
18	R2	42	3.0	0.279	2.1	LOS A	1.1	29.1	0.40	0.40	0.40	24.3
Approach		304	2.6	0.279	3.2	LOS A	1.1	29.1	0.40	0.40	0.40	25.1
East: Pleasant St (WB)												
1	L2	4	3.0	0.154	6.2	LOS A	0.7	18.6	0.39	0.20	0.39	25.9
6	T1	315	7.5	0.154	1.2	LOS A	0.7	19.0	0.38	0.20	0.38	25.5
16	R2	40	5.0	0.154	2.1	LOS A	0.7	19.0	0.38	0.20	0.38	24.7
Approach		359	7.2	0.154	1.3	LOS A	0.7	19.0	0.38	0.20	0.38	25.4
North: 10th St (SB)												
7	L2	52	2.6	0.280	6.6	LOS A	1.1	28.8	0.44	0.35	0.44	25.6
4	T1	204	2.6	0.280	1.6	LOS A	1.1	28.8	0.44	0.35	0.44	25.1
14	R2	36	3.0	0.280	2.4	LOS A	1.1	28.8	0.44	0.35	0.44	24.2
Approach		292	2.6	0.280	2.6	LOS A	1.1	28.8	0.44	0.35	0.44	25.1
West: Pleasant St (EB)												
5	L2	10	3.0	0.148	6.2	LOS A	0.7	17.6	0.38	0.20	0.38	26.3
2	T1	276	4.3	0.148	1.1	LOS A	0.7	18.1	0.37	0.21	0.37	25.5
12	R2	71	4.5	0.148	2.0	LOS A	0.7	18.1	0.37	0.22	0.37	24.5
Approach		357	4.3	0.148	1.4	LOS A	0.7	18.1	0.37	0.21	0.37	25.3
All Vehicles		1313	4.3	0.280	2.1	LOS A	1.1	29.1	0.40	0.28	0.40	25.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
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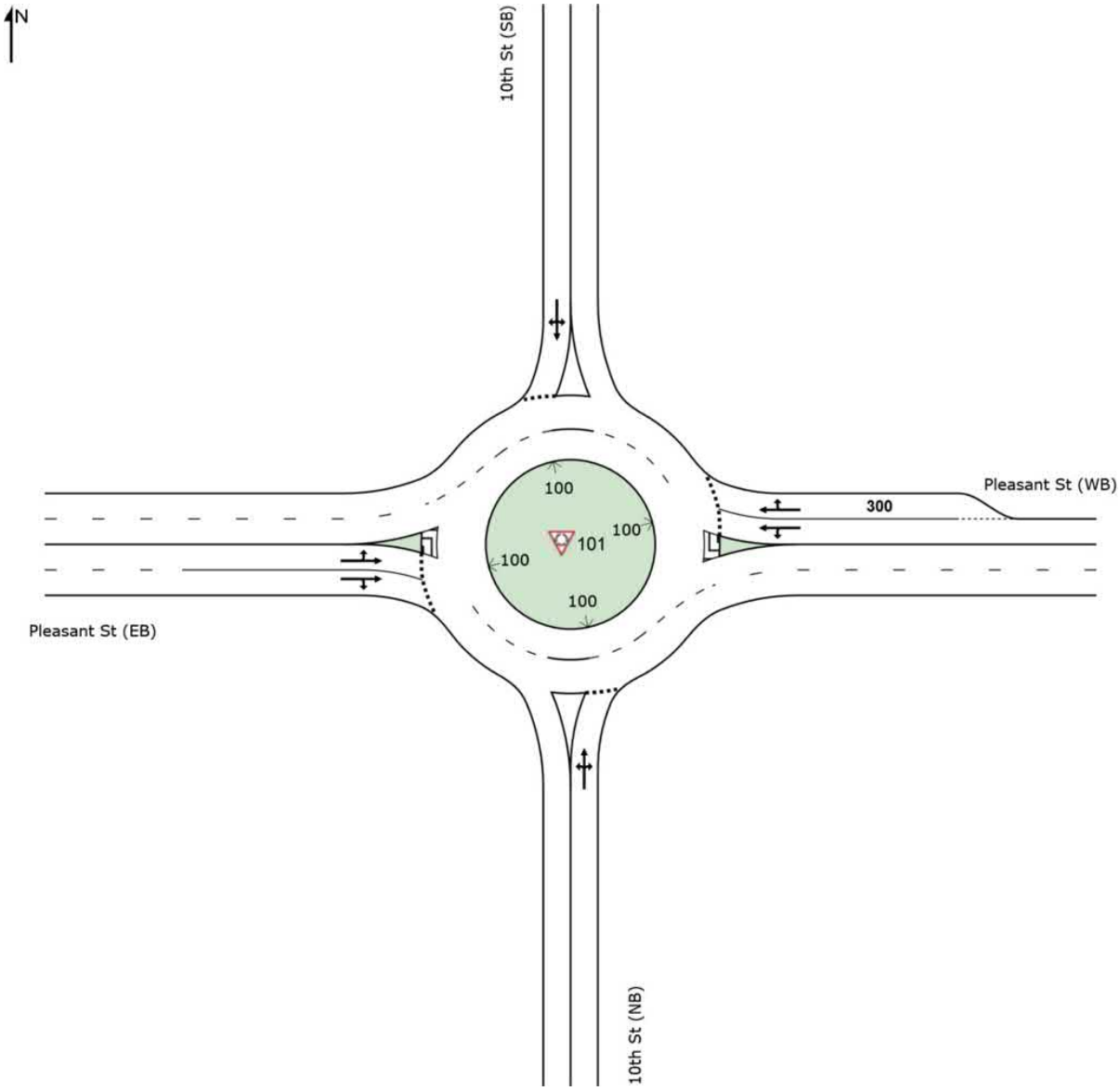
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Tuesday, April 07, 2020 11:21:53 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

SITE LAYOUT

Site: 101 [Pleasant St & 10th St - PM 2025]

Opening Year 2025
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:10:11 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

MOVEMENT SUMMARY

Site: 101 [Pleasant St & 10th St - PM 2025]

Opening Year 2025
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 10th St (NB)												
3	L2	62	0.0	0.577	8.6	LOS A	3.5	86.6	0.69	0.68	0.83	25.3
8	T1	362	0.0	0.577	3.5	LOS A	3.5	86.6	0.69	0.68	0.83	24.7
18	R2	107	0.0	0.577	4.3	LOS A	3.5	86.6	0.69	0.68	0.83	24.1
Approach		532	0.0	0.577	4.3	LOS A	3.5	86.6	0.69	0.68	0.83	24.6
East: Pleasant St (WB)												
1	L2	5	0.0	0.316	7.4	LOS A	2.1	53.8	0.64	0.37	0.64	25.4
6	T1	586	3.0	0.316	2.2	LOS A	2.3	58.3	0.64	0.36	0.64	24.8
16	R2	127	3.0	0.316	3.0	LOS A	2.3	58.3	0.63	0.36	0.63	24.2
Approach		719	3.0	0.316	2.4	LOS A	2.3	58.3	0.63	0.36	0.63	24.7
North: 10th St (SB)												
7	L2	49	0.0	0.333	7.1	LOS A	1.5	37.3	0.56	0.40	0.56	25.4
4	T1	244	1.0	0.333	2.0	LOS A	1.5	37.3	0.56	0.40	0.56	24.9
14	R2	19	1.0	0.333	2.8	LOS A	1.5	37.3	0.56	0.40	0.56	23.9
Approach		313	0.8	0.333	2.9	LOS A	1.5	37.3	0.56	0.40	0.56	24.9
West: Pleasant St (EB)												
5	L2	4	4.0	0.317	6.9	LOS A	2.0	52.4	0.54	0.26	0.54	25.8
2	T1	713	4.0	0.317	1.5	LOS A	2.1	55.4	0.53	0.25	0.53	25.1
12	R2	78	4.0	0.317	2.5	LOS A	2.1	55.4	0.51	0.24	0.51	24.1
Approach		795	4.0	0.317	1.7	LOS A	2.1	55.4	0.52	0.25	0.52	25.0
All Vehicles		2358	2.4	0.577	2.6	LOS A	3.5	86.6	0.60	0.40	0.63	24.8

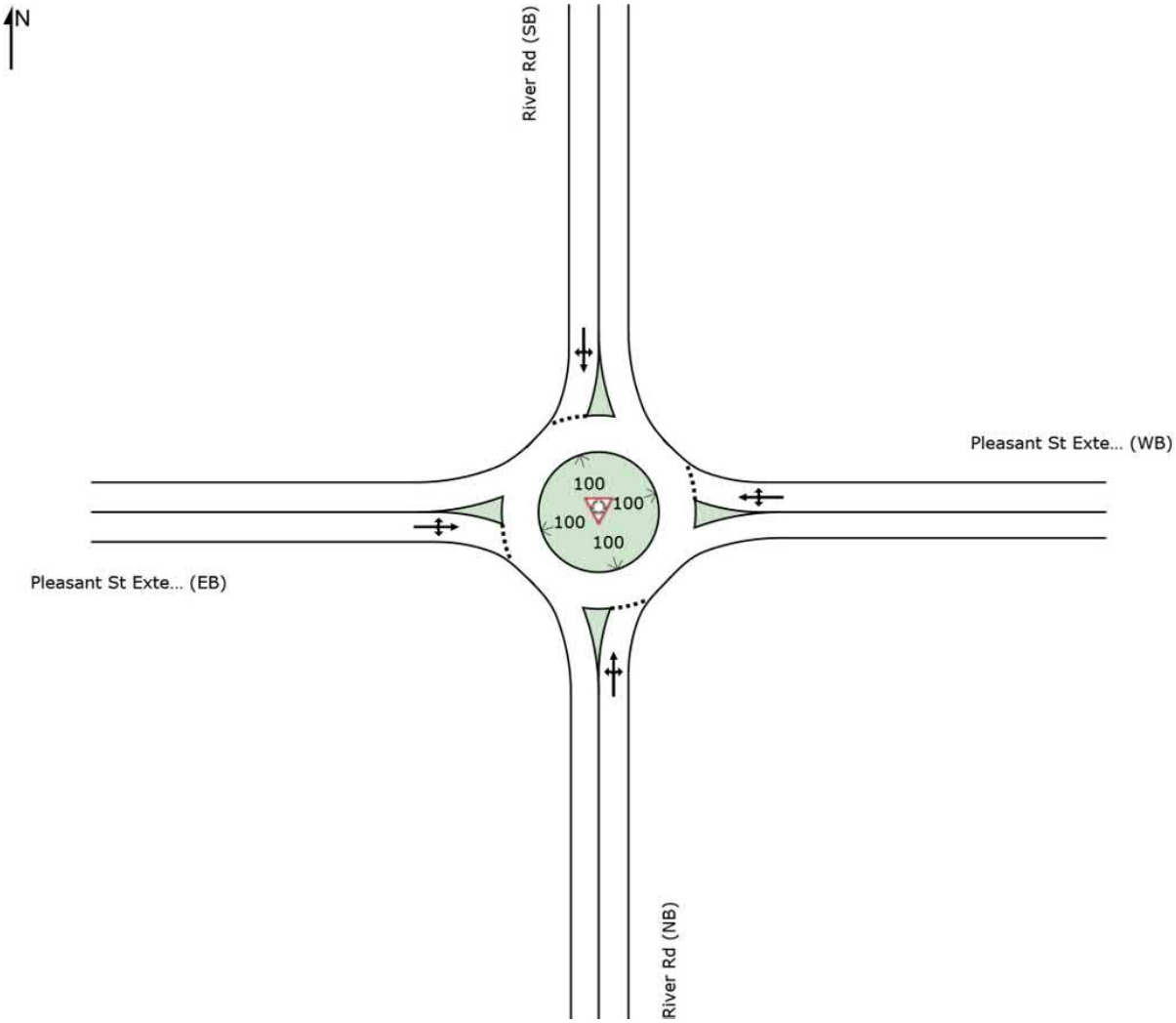
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Tuesday, April 07, 2020 11:21:53 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2025).sip8

SITE LAYOUT

Site: [Pleasant St Extension & River Rd - AM 2035]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:23:51 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension & River Rd - AM 2035]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: River Rd (NB)												
3	L2	81	20.8	0.280	10.0	LOS A	1.6	45.2	0.60	0.65	0.60	29.7
8	T1	103	11.3	0.280	3.9	LOS A	1.6	45.2	0.60	0.65	0.60	29.4
18	R2	69	13.1	0.280	6.4	LOS A	1.6	45.2	0.60	0.65	0.60	31.4
Approach		253	14.8	0.280	6.5	LOS A	1.6	45.2	0.60	0.65	0.60	30.0
East: Pleasant St Extension (WB)												
1	L2	57	4.4	0.345	10.8	LOS B	2.2	56.5	0.46	0.55	0.46	36.3
6	T1	195	5.8	0.345	4.9	LOS A	2.2	56.5	0.46	0.55	0.46	36.2
16	R2	161	3.6	0.345	4.9	LOS A	2.2	56.5	0.46	0.55	0.46	35.1
Approach		413	4.7	0.345	5.7	LOS A	2.2	56.5	0.46	0.55	0.46	35.8
North: River Rd (SB)												
7	L2	69	3.0	0.236	11.3	LOS B	1.3	33.5	0.50	0.50	0.50	32.9
4	T1	183	6.2	0.236	3.1	LOS A	1.3	33.5	0.50	0.50	0.50	29.7
14	R2	5	2.9	0.236	3.7	LOS A	1.3	33.5	0.50	0.50	0.50	28.9
Approach		257	5.3	0.236	5.3	LOS A	1.3	33.5	0.50	0.50	0.50	30.5
West: Pleasant St Extension (EB)												
5	L2	5	3.0	0.400	8.8	LOS A	2.5	66.3	0.55	0.56	0.55	32.3
2	T1	368	3.6	0.400	5.4	LOS A	2.5	66.3	0.55	0.56	0.55	35.5
12	R2	69	17.9	0.400	4.3	LOS A	2.5	66.3	0.55	0.56	0.55	30.8
Approach		443	5.8	0.400	5.3	LOS A	2.5	66.3	0.55	0.56	0.55	34.7
All Vehicles		1366	7.1	0.400	5.7	LOS A	2.5	66.3	0.52	0.56	0.52	33.2

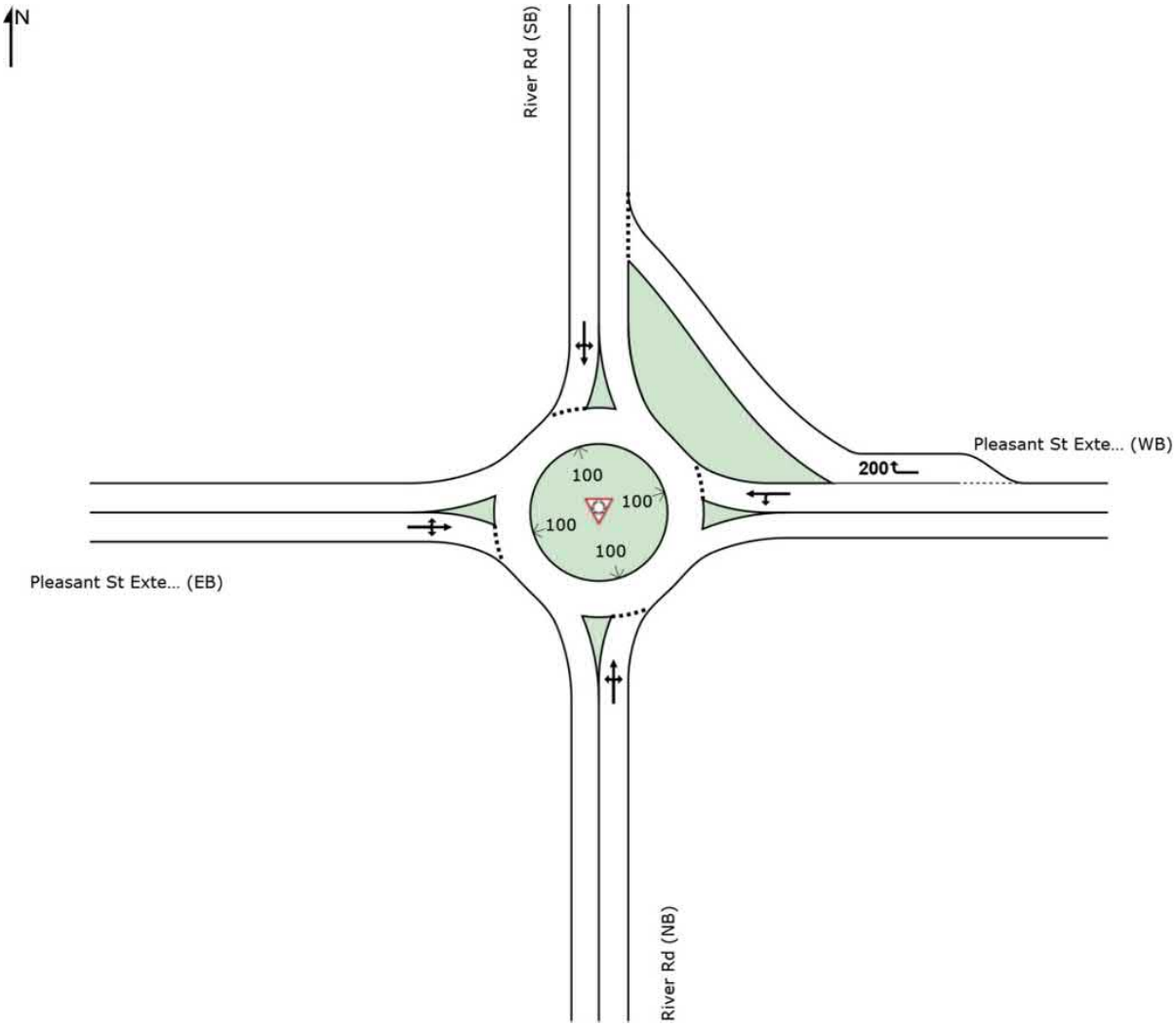
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Thursday, April 23, 2020 7:22:09 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

SITE LAYOUT

Site: [Pleasant St Extension & River Rd - AM 2035 - with WBR bypass]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:23:39 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension & River Rd - AM 2035 - with WBR bypass]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: River Rd (NB)												
3	L2	81	20.8	0.280	10.0	LOS A	1.6	45.2	0.60	0.65	0.60	29.7
8	T1	103	11.3	0.280	3.9	LOS A	1.6	45.2	0.60	0.65	0.60	29.4
18	R2	69	13.1	0.280	6.4	LOS A	1.6	45.2	0.60	0.65	0.60	31.4
Approach		253	14.8	0.280	6.5	LOS A	1.6	45.2	0.60	0.65	0.60	30.0
East: Pleasant St Extension (WB)												
1	L2	57	4.4	0.176	10.4	LOS B	1.0	26.0	0.38	0.50	0.38	36.2
6	T1	195	5.8	0.176	4.4	LOS A	1.0	26.0	0.38	0.50	0.38	36.1
16	R2	161	3.6	0.103	4.2	LOS A	0.5	14.0	0.26	0.46	0.26	36.2
Approach		413	4.7	0.176	5.2	LOS A	1.0	26.0	0.33	0.49	0.33	36.2
North: River Rd (SB)												
7	L2	69	3.0	0.234	11.3	LOS B	1.3	32.8	0.49	0.50	0.49	32.9
4	T1	183	6.2	0.234	3.1	LOS A	1.3	32.8	0.49	0.50	0.49	29.7
14	R2	5	2.9	0.234	3.7	LOS A	1.3	32.8	0.49	0.50	0.49	28.9
Approach		257	5.3	0.234	5.3	LOS A	1.3	32.8	0.49	0.50	0.49	30.5
West: Pleasant St Extension (EB)												
5	L2	5	3.0	0.400	8.8	LOS A	2.5	66.1	0.55	0.56	0.55	32.3
2	T1	368	3.6	0.400	5.4	LOS A	2.5	66.1	0.55	0.56	0.55	35.5
12	R2	69	17.9	0.400	4.3	LOS A	2.5	66.1	0.55	0.56	0.55	30.8
Approach		443	5.8	0.400	5.3	LOS A	2.5	66.1	0.55	0.56	0.55	34.7
All Vehicles		1366	7.1	0.400	5.5	LOS A	2.5	66.1	0.48	0.54	0.48	33.3

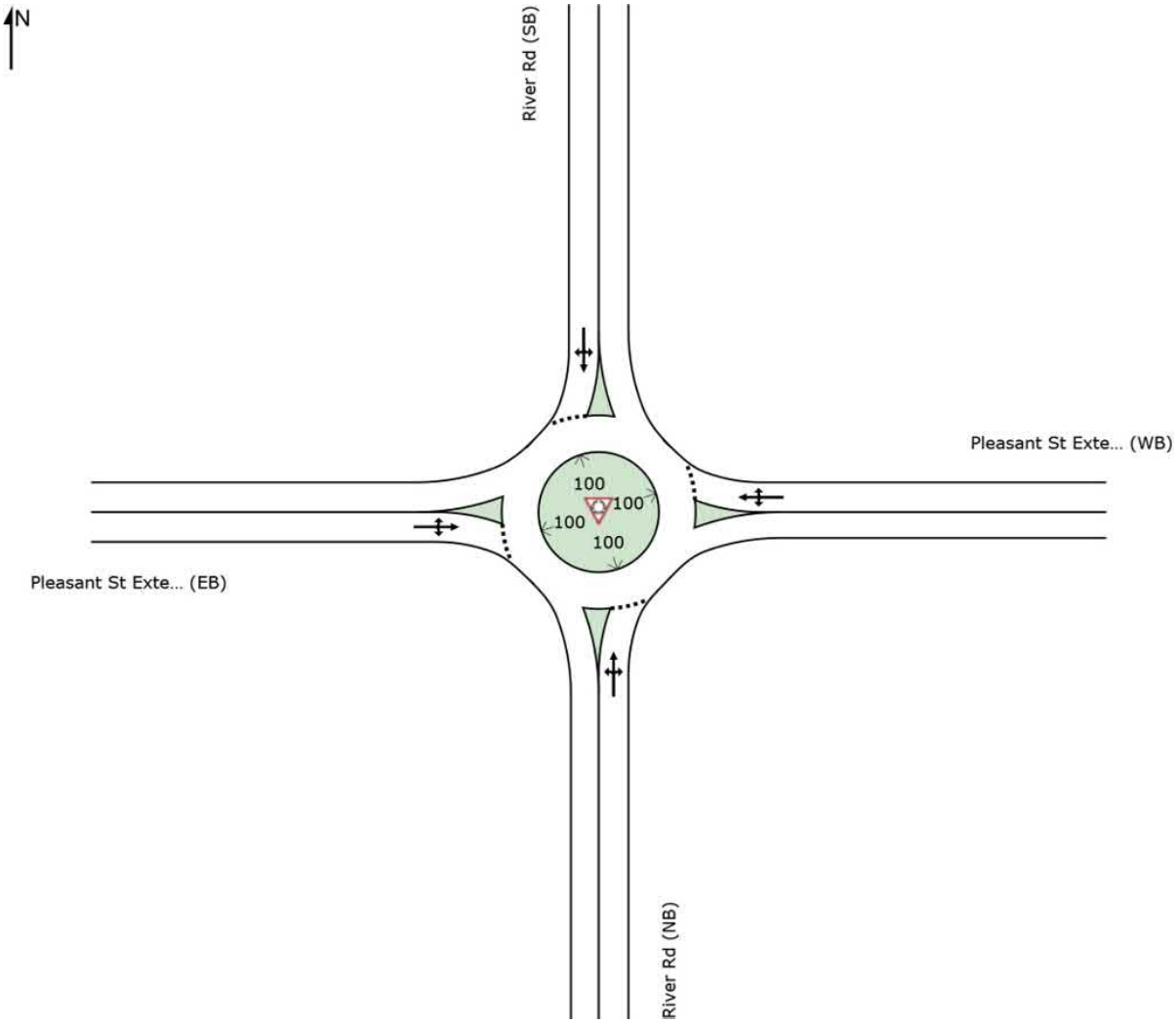
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Thursday, April 23, 2020 7:17:02 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

SITE LAYOUT

Site: [Pleasant St Extension & River Rd - PM 2035]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:23:49 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension & River Rd - PM 2035]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: River Rd (NB)												
3	L2	139	5.7	0.551	12.0	LOS B	4.7	122.9	0.80	0.87	0.92	28.9
8	T1	282	5.2	0.551	6.3	LOS A	4.7	122.9	0.80	0.87	0.92	28.5
18	R2	83	2.1	0.551	8.5	LOS A	4.7	122.9	0.80	0.87	0.92	30.6
Approach		503	4.8	0.551	8.2	LOS A	4.7	122.9	0.80	0.87	0.92	29.0
East: Pleasant St Extension (WB)												
1	L2	35	3.4	0.645	14.2	LOS B	6.7	171.6	0.84	0.86	0.97	35.2
6	T1	292	2.4	0.645	8.1	LOS A	6.7	171.6	0.84	0.86	0.97	35.2
16	R2	316	4.3	0.645	8.4	LOS A	6.7	171.6	0.84	0.86	0.97	34.0
Approach		643	3.4	0.645	8.6	LOS A	6.7	171.6	0.84	0.86	0.97	34.6
North: River Rd (SB)												
7	L2	139	3.0	0.353	12.2	LOS B	2.3	59.4	0.66	0.64	0.66	32.7
4	T1	199	7.1	0.353	4.0	LOS A	2.3	59.4	0.66	0.64	0.66	29.5
14	R2	5	3.0	0.353	4.5	LOS A	2.3	59.4	0.66	0.64	0.66	28.7
Approach		343	5.4	0.353	7.3	LOS A	2.3	59.4	0.66	0.64	0.66	30.7
West: Pleasant St Extension (EB)												
5	L2	5	3.0	0.474	9.3	LOS A	3.4	86.8	0.66	0.61	0.66	32.1
2	T1	422	2.7	0.474	5.9	LOS A	3.4	86.8	0.66	0.61	0.66	35.2
12	R2	71	15.8	0.474	4.8	LOS A	3.4	86.8	0.66	0.61	0.66	30.6
Approach		498	4.6	0.474	5.8	LOS A	3.4	86.8	0.66	0.61	0.66	34.5
All Vehicles		1988	4.4	0.645	7.6	LOS A	6.7	171.6	0.75	0.76	0.83	32.3

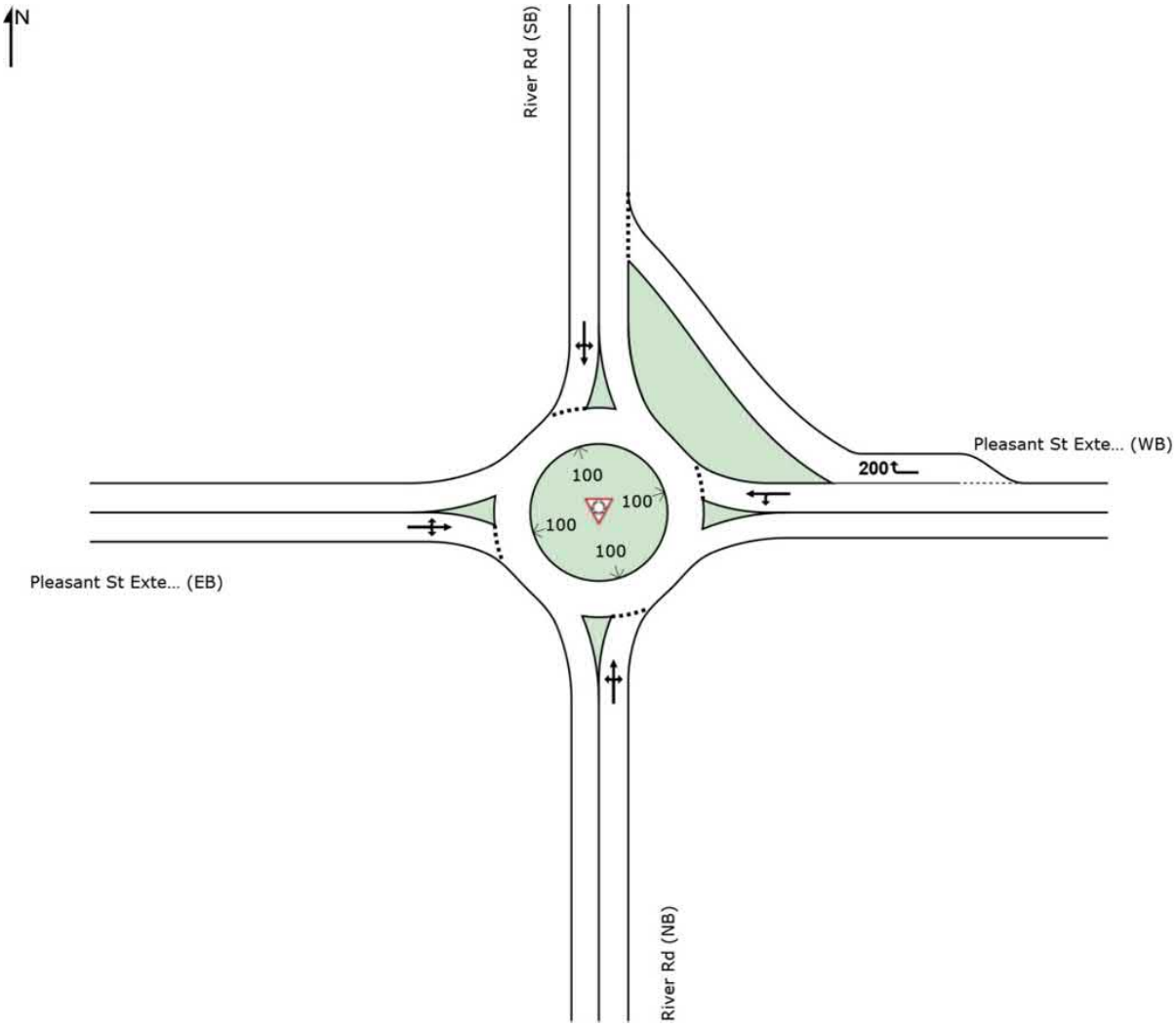
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Thursday, April 23, 2020 7:17:52 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

SITE LAYOUT

Site: [Pleasant St Extension & River Rd - PM 2035 - with WBR bypass]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:23:45 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension & River Rd - PM 2035 - with WBR bypass]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: River Rd (NB)												
3	L2	139	5.7	0.551	12.0	LOS B	4.7	122.8	0.80	0.87	0.92	28.9
8	T1	282	5.2	0.551	6.3	LOS A	4.7	122.8	0.80	0.87	0.92	28.5
18	R2	83	2.1	0.551	8.5	LOS A	4.7	122.8	0.80	0.87	0.92	30.6
Approach		503	4.8	0.551	8.2	LOS A	4.7	122.8	0.80	0.87	0.92	29.0
East: Pleasant St Extension (WB)												
1	L2	35	3.4	0.262	11.3	LOS B	1.8	46.2	0.62	0.56	0.62	35.8
6	T1	292	2.4	0.262	5.3	LOS A	1.8	46.2	0.62	0.56	0.62	35.7
16	R2	316	4.3	0.233	4.9	LOS A	1.5	38.4	0.49	0.56	0.49	35.6
Approach		643	3.4	0.262	5.4	LOS A	1.8	46.2	0.55	0.56	0.55	35.7
North: River Rd (SB)												
7	L2	139	3.0	0.346	12.2	LOS B	2.1	56.0	0.63	0.64	0.63	32.7
4	T1	199	7.1	0.346	4.0	LOS A	2.1	56.0	0.63	0.64	0.63	29.6
14	R2	5	3.0	0.346	4.5	LOS A	2.1	56.0	0.63	0.64	0.63	28.8
Approach		343	5.4	0.346	7.3	LOS A	2.1	56.0	0.63	0.64	0.63	30.8
West: Pleasant St Extension (EB)												
5	L2	5	3.0	0.473	9.3	LOS A	3.3	86.2	0.66	0.61	0.66	32.1
2	T1	422	2.7	0.473	5.9	LOS A	3.3	86.2	0.66	0.61	0.66	35.2
12	R2	71	15.8	0.473	4.8	LOS A	3.3	86.2	0.66	0.61	0.66	30.6
Approach		498	4.6	0.473	5.8	LOS A	3.3	86.2	0.66	0.61	0.66	34.5
All Vehicles		1988	4.4	0.551	6.5	LOS A	4.7	122.8	0.66	0.66	0.69	32.6

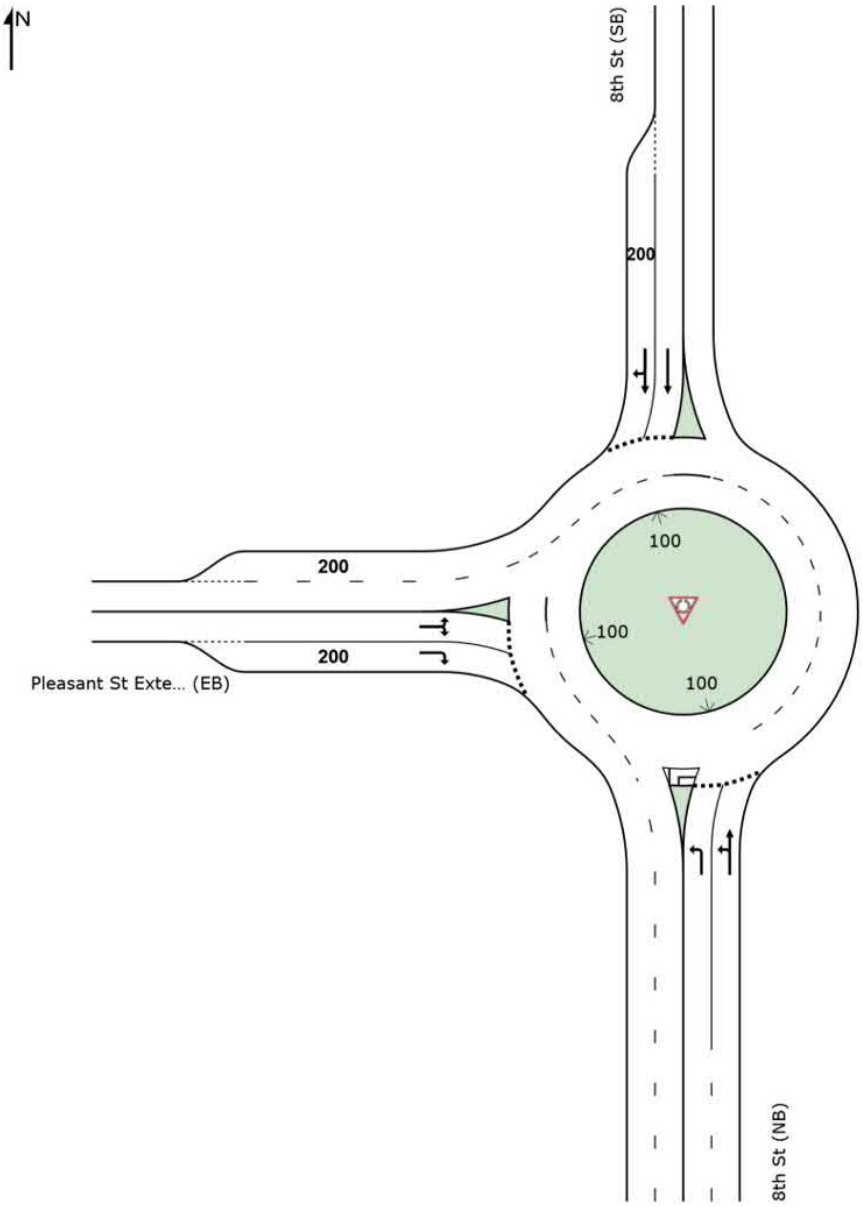
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Thursday, April 23, 2020 7:16:49 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

SITE LAYOUT

Site: [Pleasant St Extension/Walnut & 8th St - AM 2035]

Interim Year 2035
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:23:32 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension/Walnut & 8th St - AM 2035]

Interim Year 2035
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	571	2.0	0.320	7.1	LOS A	2.2	55.7	0.05	0.56	0.05	28.3
8	T1	281	2.0	0.202	1.3	LOS A	1.2	30.2	0.05	0.18	0.05	30.9
Approach		852	2.0	0.320	5.2	LOS A	2.2	55.7	0.05	0.44	0.05	29.1
North: 8th St (SB)												
4	T1	404	2.0	0.195	3.9	LOS A	0.9	23.0	0.50	0.47	0.50	28.8
14	R2	10	3.0	0.195	4.4	LOS A	0.9	23.0	0.50	0.45	0.50	28.3
Approach		415	2.0	0.195	3.9	LOS A	0.9	23.0	0.50	0.47	0.50	28.8
West: Pleasant St Extension (EB)												
5	L2	5	0.0	0.270	8.2	LOS A	1.1	30.0	0.44	0.52	0.44	30.0
12	R2	575	11.0	0.270	3.5	LOS A	1.1	30.8	0.44	0.50	0.44	27.9
Approach		580	10.9	0.270	3.6	LOS A	1.1	30.8	0.44	0.50	0.44	27.9
All Vehicles		1847	4.8	0.320	4.4	LOS A	2.2	55.7	0.27	0.46	0.27	28.6

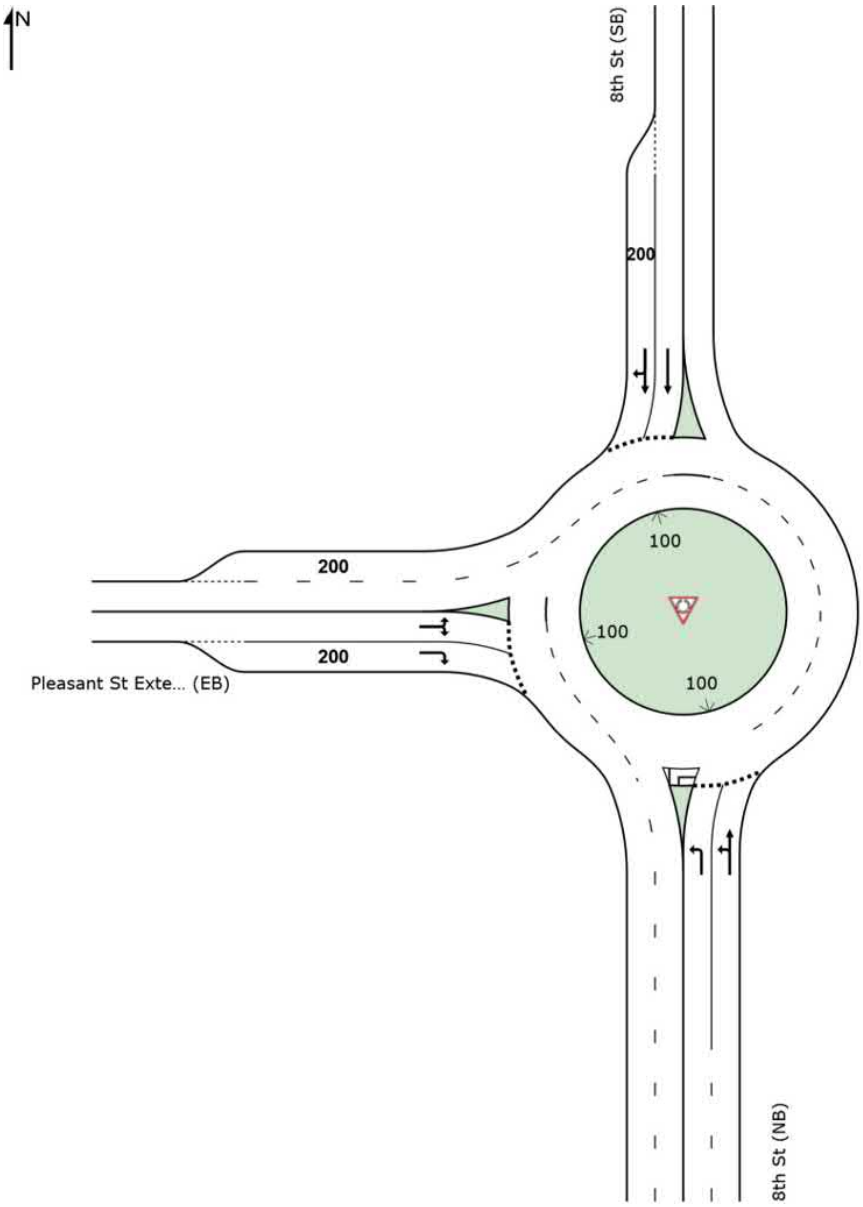
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Tuesday, April 07, 2020 9:33:26 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

SITE LAYOUT

Site: [Pleasant St Extension/Walnut & 8th St - PM 2035]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:23:47 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension/Walnut & 8th St - PM 2035]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	824	3.0	0.475	7.2	LOS A	4.2	107.6	0.07	0.56	0.07	28.2
8	T1	551	3.0	0.378	1.3	LOS A	2.9	73.2	0.07	0.16	0.07	30.9
Approach		1375	3.0	0.475	4.8	LOS A	4.2	107.6	0.07	0.40	0.07	29.2
North: 8th St (SB)												
4	T1	508	3.0	0.310	6.7	LOS A	1.9	47.7	0.71	0.73	0.71	27.9
14	R2	11	3.0	0.310	7.0	LOS A	1.9	47.7	0.71	0.71	0.71	27.8
Approach		518	3.0	0.310	6.7	LOS A	1.9	47.7	0.71	0.73	0.71	27.9
West: Pleasant St Extension (EB)												
5	L2	5	3.0	0.419	8.8	LOS A	2.1	53.2	0.56	0.58	0.57	29.8
12	R2	908	3.0	0.419	3.8	LOS A	2.1	54.6	0.55	0.54	0.56	27.6
Approach		913	3.0	0.419	3.8	LOS A	2.1	54.6	0.56	0.54	0.56	27.6
All Vehicles		2807	3.0	0.475	4.8	LOS A	4.2	107.6	0.35	0.51	0.35	28.5

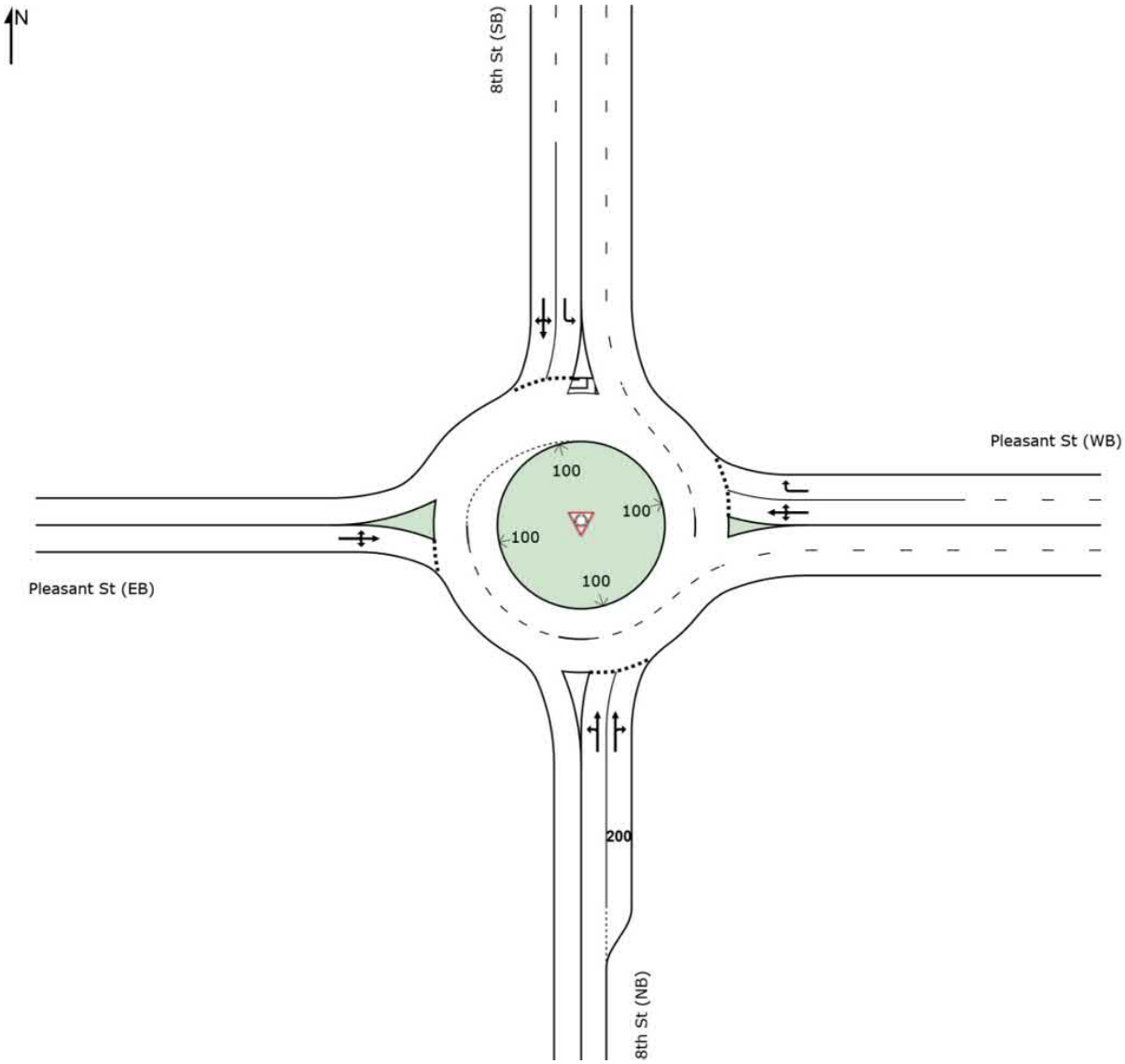
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Tuesday, April 07, 2020 10:36:55 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

SITE LAYOUT

Site: [Pleasant St & 8th St - AM 2035]

Interim Year 2035
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:23:34 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

MOVEMENT SUMMARY

Site: [Pleasant St & 8th St - AM 2035]

Interim Year 2035
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	1	0.0	0.187	6.7	LOS A	0.9	22.4	0.45	0.40	0.45	27.8
8	T1	370	5.0	0.187	3.2	LOS A	0.9	23.6	0.44	0.40	0.44	28.9
18	R2	32	39.0	0.187	3.6	LOS A	0.9	23.6	0.44	0.39	0.44	26.6
Approach		403	7.7	0.187	3.3	LOS A	0.9	23.6	0.44	0.40	0.44	28.7
East: Pleasant St (WB)												
1	L2	32	46.0	0.237	7.9	LOS A	1.0	26.8	0.45	0.46	0.45	28.5
6	T1	19	14.0	0.237	1.5	LOS A	1.0	26.8	0.45	0.46	0.45	23.6
16	R2	481	2.0	0.237	2.3	LOS A	1.0	26.4	0.43	0.40	0.43	24.6
Approach		532	5.1	0.237	2.6	LOS A	1.0	26.8	0.43	0.41	0.43	24.9
North: 8th St (SB)												
7	L2	358	2.0	0.262	5.6	LOS A	1.6	40.5	0.24	0.50	0.24	24.6
4	T1	621	3.0	0.375	1.8	LOS A	2.7	68.2	0.25	0.22	0.25	30.0
14	R2	1	13.0	0.375	1.5	LOS A	2.7	68.2	0.25	0.22	0.25	25.4
Approach		980	2.6	0.375	3.2	LOS A	2.7	68.2	0.25	0.32	0.25	28.5
West: Pleasant St (EB)												
5	L2	1	0.0	0.028	7.5	LOS A	0.1	2.6	0.54	0.47	0.54	26.0
2	T1	13	11.0	0.028	3.0	LOS A	0.1	2.6	0.54	0.47	0.54	25.0
12	R2	8	0.0	0.028	3.3	LOS A	0.1	2.6	0.54	0.47	0.54	26.2
Approach		22	6.3	0.028	3.3	LOS A	0.1	2.6	0.54	0.47	0.54	25.6
All Vehicles		1938	4.4	0.375	3.0	LOS A	2.7	68.2	0.34	0.36	0.34	27.7

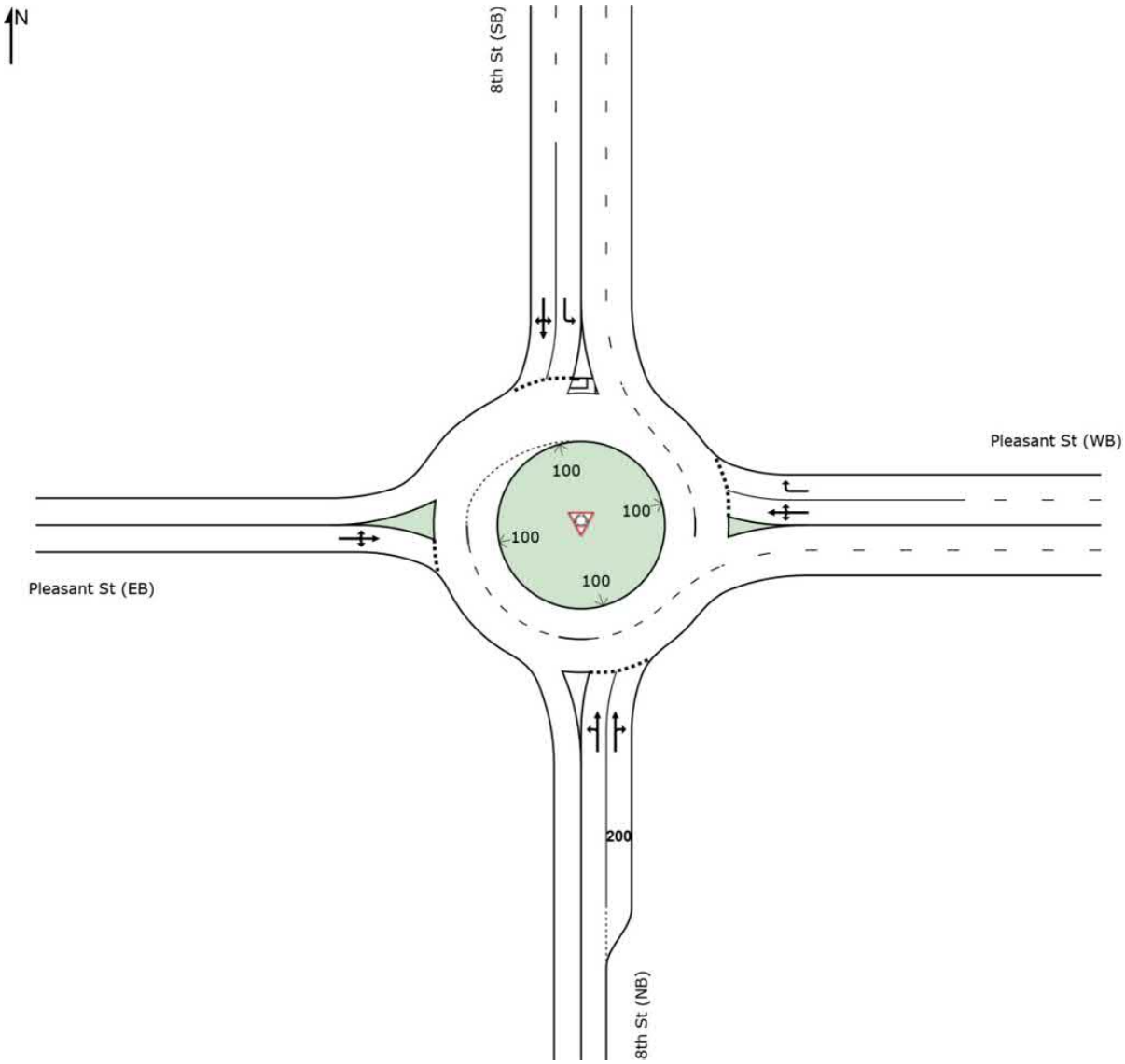
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Tuesday, April 07, 2020 9:35:03 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

SITE LAYOUT

Site: [Pleasant St & 8th St - PM 2035]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:23:36 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

MOVEMENT SUMMARY

Site: [Pleasant St & 8th St - PM 2035]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	13	0.0	0.322	8.1	LOS A	1.5	38.6	0.61	0.57	0.61	27.3
8	T1	584	1.0	0.322	4.4	LOS A	1.6	40.7	0.61	0.54	0.61	28.2
18	R2	34	0.0	0.322	3.7	LOS A	1.6	40.7	0.60	0.51	0.60	26.2
Approach		631	0.9	0.322	4.4	LOS A	1.6	40.7	0.61	0.54	0.61	28.0
East: Pleasant St (WB)												
1	L2	23	30.0	0.375	8.5	LOS A	1.8	45.8	0.59	0.56	0.59	28.3
6	T1	7	20.0	0.375	2.7	LOS A	1.8	45.8	0.59	0.56	0.59	23.4
16	R2	749	1.0	0.375	2.9	LOS A	1.9	47.4	0.58	0.50	0.58	24.1
Approach		780	2.1	0.375	3.0	LOS A	1.9	47.4	0.58	0.50	0.58	24.3
North: 8th St (SB)												
7	L2	759	1.0	0.438	5.6	LOS A	3.4	85.8	0.25	0.46	0.25	25.2
4	T1	627	1.0	0.438	1.7	LOS A	3.4	85.8	0.23	0.28	0.23	29.6
14	R2	3	0.0	0.438	1.3	LOS A	3.4	85.8	0.23	0.28	0.23	25.1
Approach		1388	1.0	0.438	3.8	LOS A	3.4	85.8	0.24	0.37	0.24	27.6
West: Pleasant St (EB)												
5	L2	3	0.0	0.012	8.0	LOS A	0.0	1.1	0.59	0.59	0.59	25.4
2	T1	1	0.0	0.012	3.1	LOS A	0.0	1.1	0.59	0.59	0.59	24.5
12	R2	5	0.0	0.012	3.8	LOS A	0.0	1.1	0.59	0.59	0.59	25.8
Approach		10	0.0	0.012	5.1	LOS A	0.0	1.1	0.59	0.59	0.59	25.6
All Vehicles		2809	1.3	0.438	3.7	LOS A	3.4	85.8	0.42	0.45	0.42	27.0

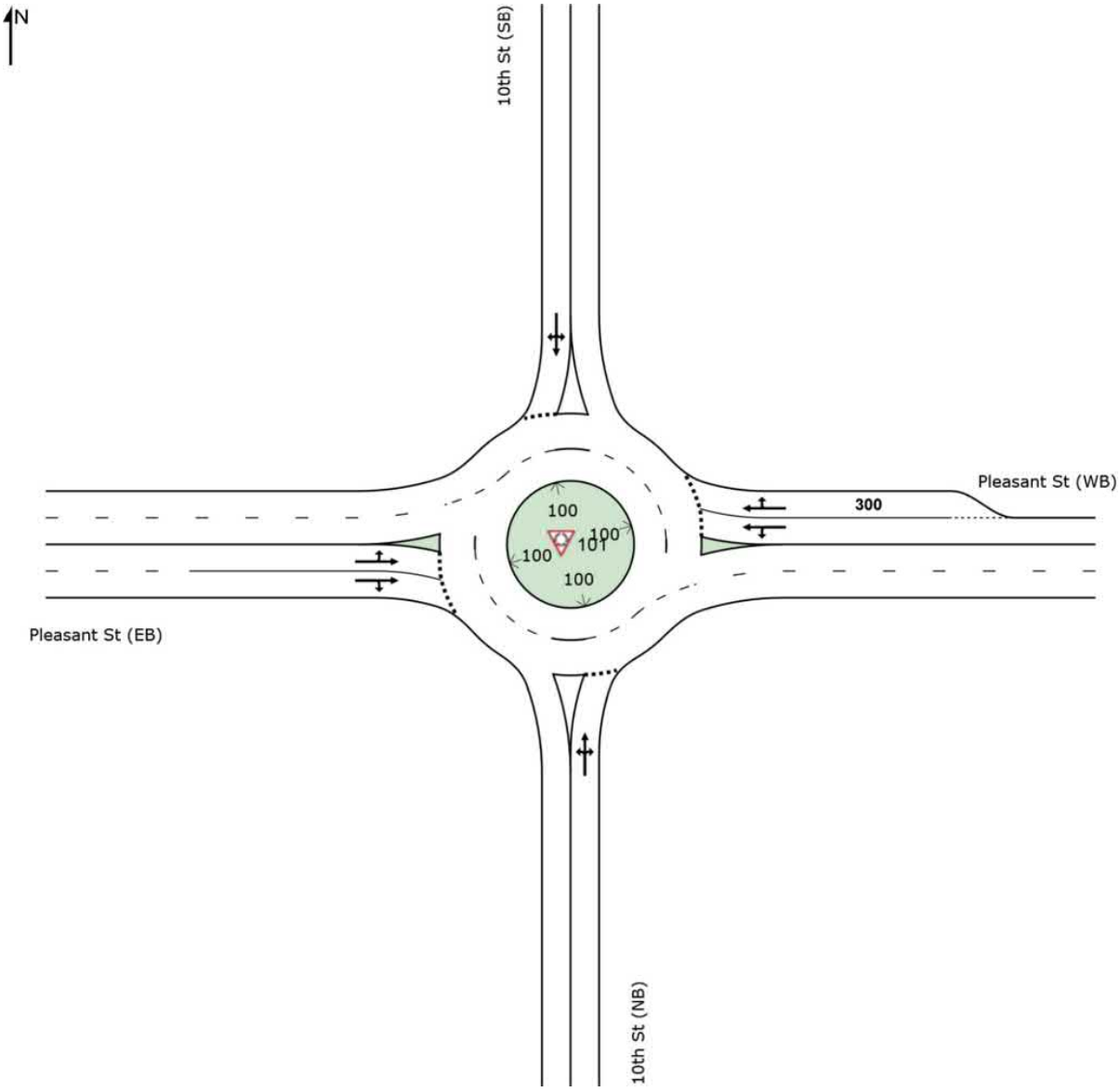
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Tuesday, April 07, 2020 9:57:16 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

SITE LAYOUT

Site: 101 [Pleasant St & 10th St - AM 2035]

Interim Year 2035
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:23:43 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

MOVEMENT SUMMARY

Site: 101 [Pleasant St & 10th St - AM 2035]

Interim Year 2035
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 10th St (NB)												
3	L2	127	3.0	0.334	6.6	LOS A	1.4	36.6	0.45	0.43	0.45	25.7
8	T1	177	2.2	0.334	1.5	LOS A	1.4	36.6	0.45	0.43	0.45	24.9
18	R2	48	3.0	0.334	2.3	LOS A	1.4	36.6	0.45	0.43	0.45	24.2
Approach		353	2.6	0.334	3.5	LOS A	1.4	36.6	0.45	0.43	0.45	25.0
East: Pleasant St (WB)												
1	L2	5	3.0	0.186	6.5	LOS A	0.9	23.4	0.43	0.23	0.43	25.8
6	T1	366	7.5	0.186	1.4	LOS A	0.9	24.1	0.43	0.23	0.43	25.4
16	R2	46	5.0	0.186	2.3	LOS A	0.9	24.1	0.42	0.23	0.42	24.6
Approach		418	7.2	0.186	1.6	LOS A	0.9	24.1	0.43	0.23	0.43	25.3
North: 10th St (SB)												
7	L2	59	2.6	0.338	6.9	LOS A	1.4	36.6	0.50	0.38	0.50	25.6
4	T1	237	2.6	0.338	1.8	LOS A	1.4	36.6	0.50	0.38	0.50	25.0
14	R2	43	3.0	0.338	2.7	LOS A	1.4	36.6	0.50	0.38	0.50	24.0
Approach		340	2.7	0.338	2.8	LOS A	1.4	36.6	0.50	0.38	0.50	25.0
West: Pleasant St (EB)												
5	L2	11	3.0	0.178	6.4	LOS A	0.9	22.1	0.42	0.23	0.42	26.2
2	T1	320	4.3	0.178	1.3	LOS A	0.9	22.9	0.42	0.24	0.42	25.4
12	R2	84	4.5	0.178	2.2	LOS A	0.9	22.9	0.41	0.25	0.41	24.4
Approach		414	4.3	0.178	1.6	LOS A	0.9	22.9	0.42	0.24	0.42	25.2
All Vehicles		1524	4.3	0.338	2.3	LOS A	1.4	36.6	0.45	0.31	0.45	25.1

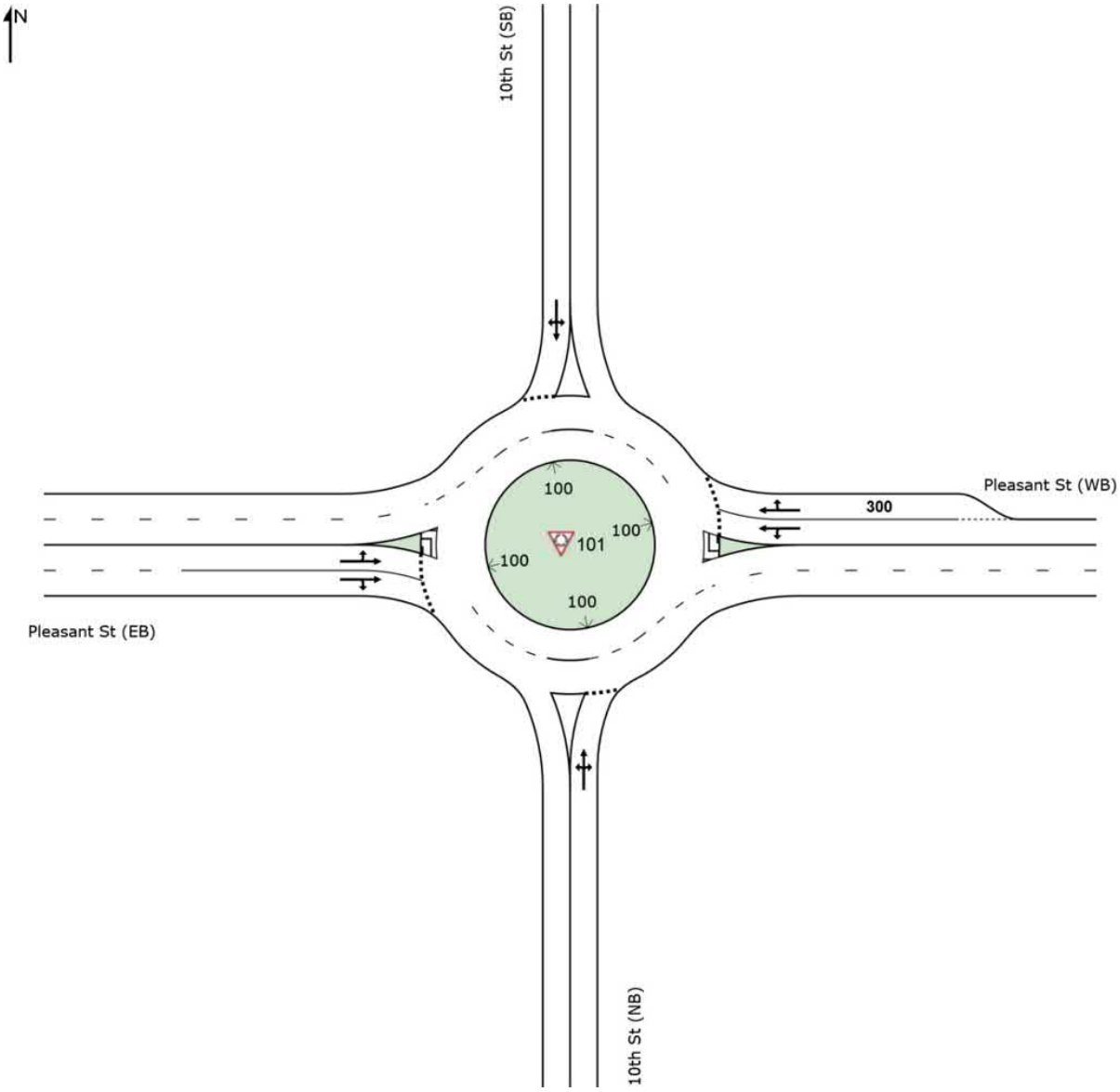
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Tuesday, April 07, 2020 9:38:30 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

SITE LAYOUT

Site: 101 [Pleasant St & 10th St - PM 2035]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 7:23:41 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

MOVEMENT SUMMARY

Site: 101 [Pleasant St & 10th St - PM 2035]

Interim Year 2035
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 10th St (NB)												
3	L2	72	0.0	0.721	10.4	LOS B	5.4	134.4	0.80	0.96	1.09	24.9
8	T1	420	0.0	0.721	5.3	LOS A	5.4	134.4	0.80	0.96	1.09	24.4
18	R2	125	0.0	0.721	6.1	LOS A	5.4	134.4	0.80	0.96	1.09	23.8
Approach		617	0.0	0.721	6.0	LOS A	5.4	134.4	0.80	0.96	1.09	24.3
East: Pleasant St (WB)												
1	L2	6	0.0	0.396	8.0	LOS A	2.9	73.2	0.74	0.46	0.74	25.2
6	T1	680	3.0	0.396	2.7	LOS A	3.1	80.5	0.73	0.45	0.73	24.6
16	R2	147	3.0	0.396	3.5	LOS A	3.1	80.5	0.73	0.43	0.73	24.1
Approach		834	3.0	0.396	2.9	LOS A	3.1	80.5	0.73	0.44	0.73	24.5
North: 10th St (SB)												
7	L2	57	0.0	0.414	7.6	LOS A	2.1	52.4	0.64	0.50	0.68	25.3
4	T1	283	1.0	0.414	2.6	LOS A	2.1	52.4	0.64	0.50	0.68	24.7
14	R2	22	1.0	0.414	3.4	LOS A	2.1	52.4	0.64	0.50	0.68	23.8
Approach		362	0.8	0.414	3.4	LOS A	2.1	52.4	0.64	0.50	0.68	24.8
West: Pleasant St (EB)												
5	L2	5	4.0	0.385	7.3	LOS A	2.6	68.2	0.61	0.32	0.61	25.6
2	T1	827	4.0	0.385	1.9	LOS A	2.8	72.9	0.60	0.31	0.60	24.9
12	R2	91	4.0	0.385	2.8	LOS A	2.8	72.9	0.59	0.29	0.59	23.9
Approach		923	4.0	0.385	2.0	LOS A	2.8	72.9	0.60	0.31	0.60	24.8
All Vehicles		2736	2.4	0.721	3.4	LOS A	5.4	134.4	0.69	0.52	0.76	24.6

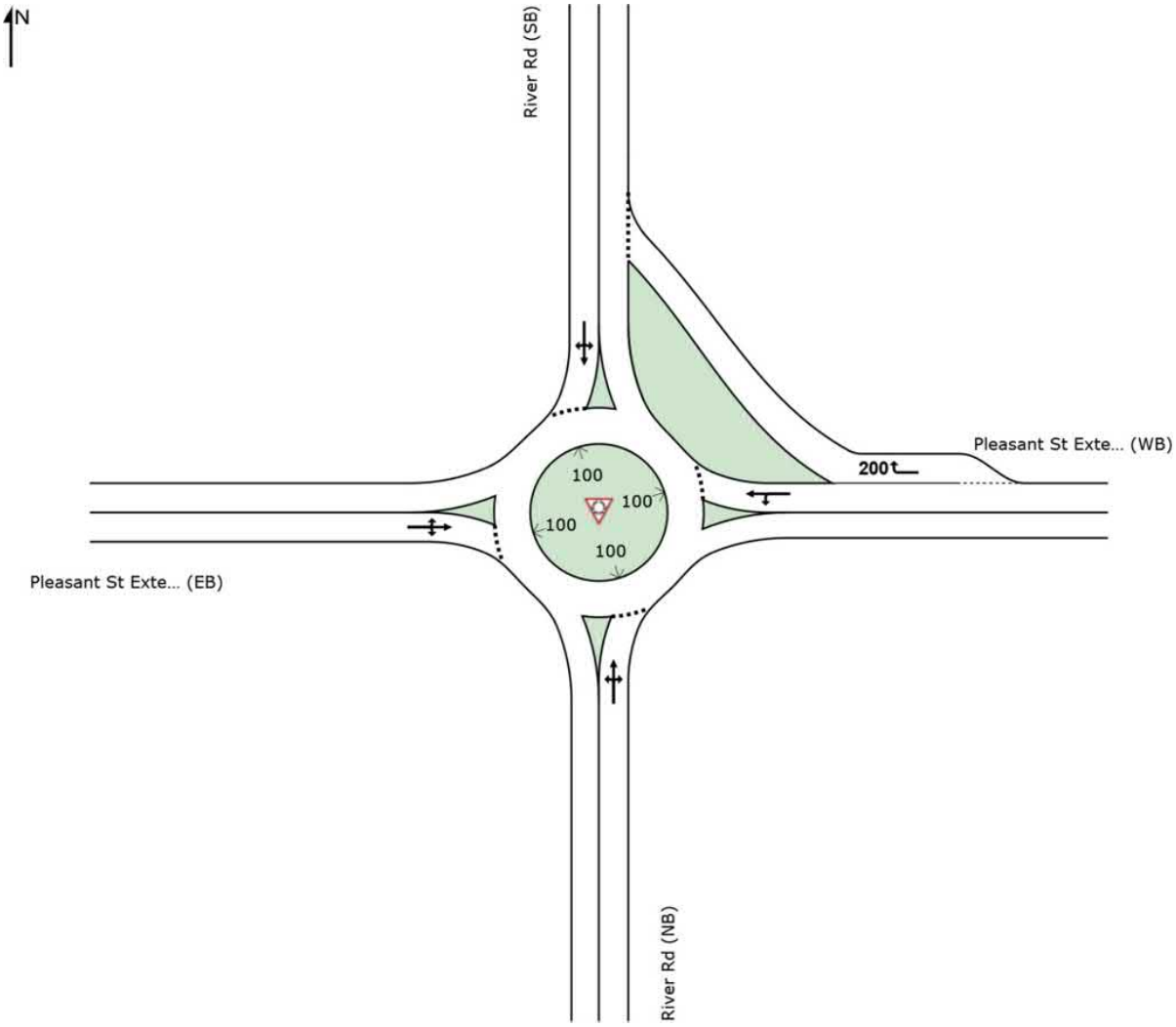
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Tuesday, April 07, 2020 9:52:14 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (2035).sip8

SITE LAYOUT

Site: [Pleasant St Extension & River Rd - AM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 6:58:34 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension & River Rd - AM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: River Rd (NB)												
3	L2	94	20.8	0.348	10.6	LOS B	2.2	60.3	0.69	0.71	0.69	28.3
8	T1	119	11.3	0.348	4.5	LOS A	2.2	60.3	0.69	0.71	0.69	27.8
18	R2	80	13.1	0.348	7.0	LOS A	2.2	60.3	0.69	0.71	0.69	30.7
Approach		293	14.8	0.348	7.1	LOS A	2.2	60.3	0.69	0.71	0.69	28.7
East: Pleasant St Extension (WB)												
1	L2	67	4.4	0.210	10.6	LOS B	1.3	32.7	0.43	0.52	0.43	31.7
6	T1	226	5.8	0.210	4.6	LOS A	1.3	32.7	0.43	0.52	0.43	36.0
16	R2	186	3.6	0.122	4.2	LOS A	0.7	17.1	0.29	0.47	0.29	36.1
Approach		479	4.7	0.210	5.3	LOS A	1.3	32.7	0.37	0.50	0.37	35.6
North: River Rd (SB)												
7	L2	80	3.0	0.284	11.7	LOS B	1.6	42.2	0.56	0.55	0.56	32.7
4	T1	213	6.2	0.284	3.5	LOS A	1.6	42.2	0.56	0.55	0.56	29.3
14	R2	6	2.9	0.284	4.1	LOS A	1.6	42.2	0.56	0.55	0.56	28.7
Approach		299	5.3	0.284	5.7	LOS A	1.6	42.2	0.56	0.55	0.56	30.4
West: Pleasant St Extension (EB)												
5	L2	6	3.0	0.483	9.3	LOS A	3.3	87.2	0.64	0.61	0.64	32.1
2	T1	427	3.6	0.483	5.9	LOS A	3.3	87.2	0.64	0.61	0.64	35.2
12	R2	80	17.9	0.483	4.9	LOS A	3.3	87.2	0.64	0.61	0.64	31.0
Approach		513	5.8	0.483	5.8	LOS A	3.3	87.2	0.64	0.61	0.64	34.7
All Vehicles		1583	7.1	0.483	5.9	LOS A	3.3	87.2	0.55	0.58	0.55	33.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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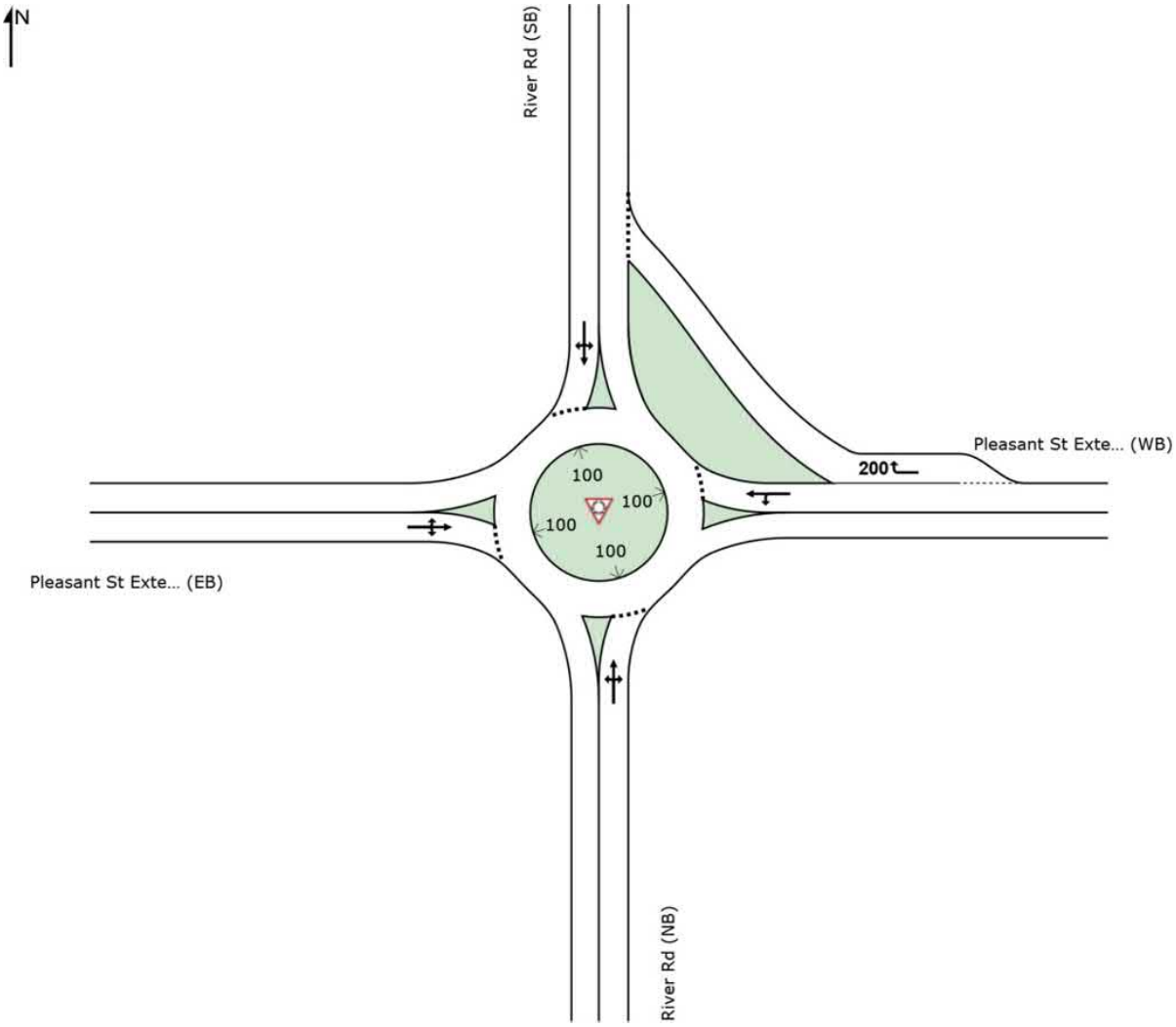
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

SITE LAYOUT

Site: [Pleasant St Extension & River Rd - PM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



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Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension & River Rd - PM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: River Rd (NB)												
3	L2	162	5.7	0.711	16.4	LOS B	8.4	219.2	0.95	1.12	1.33	25.7
8	T1	326	5.2	0.711	10.7	LOS B	8.4	219.2	0.95	1.12	1.33	25.3
18	R2	96	2.1	0.711	12.9	LOS B	8.4	219.2	0.95	1.12	1.33	27.8
Approach		584	4.8	0.711	12.6	LOS B	8.4	219.2	0.95	1.12	1.33	25.8
East: Pleasant St Extension (WB)												
1	L2	40	3.4	0.330	11.8	LOS B	2.5	64.8	0.72	0.60	0.72	30.9
6	T1	339	2.4	0.330	5.7	LOS A	2.5	64.8	0.72	0.60	0.72	35.4
16	R2	367	4.3	0.284	5.1	LOS A	2.0	50.9	0.57	0.60	0.57	35.4
Approach		747	3.4	0.330	5.7	LOS A	2.5	64.8	0.65	0.60	0.65	35.2
North: River Rd (SB)												
7	L2	162	3.0	0.433	12.9	LOS B	2.9	76.8	0.73	0.71	0.73	32.4
4	T1	230	7.1	0.433	4.8	LOS A	2.9	76.8	0.73	0.71	0.73	29.0
14	R2	7	3.0	0.433	5.2	LOS A	2.9	76.8	0.73	0.71	0.73	28.5
Approach		399	5.4	0.433	8.1	LOS A	2.9	76.8	0.73	0.71	0.73	30.6
West: Pleasant St Extension (EB)												
5	L2	7	3.0	0.583	10.8	LOS B	5.2	135.1	0.78	0.80	0.87	31.7
2	T1	489	2.7	0.583	7.4	LOS A	5.2	135.1	0.78	0.80	0.87	34.8
12	R2	82	15.8	0.583	6.5	LOS A	5.2	135.1	0.78	0.80	0.87	30.5
Approach		577	4.6	0.583	7.3	LOS A	5.2	135.1	0.78	0.80	0.87	34.3
All Vehicles		2307	4.4	0.711	8.3	LOS A	8.4	219.2	0.77	0.80	0.89	31.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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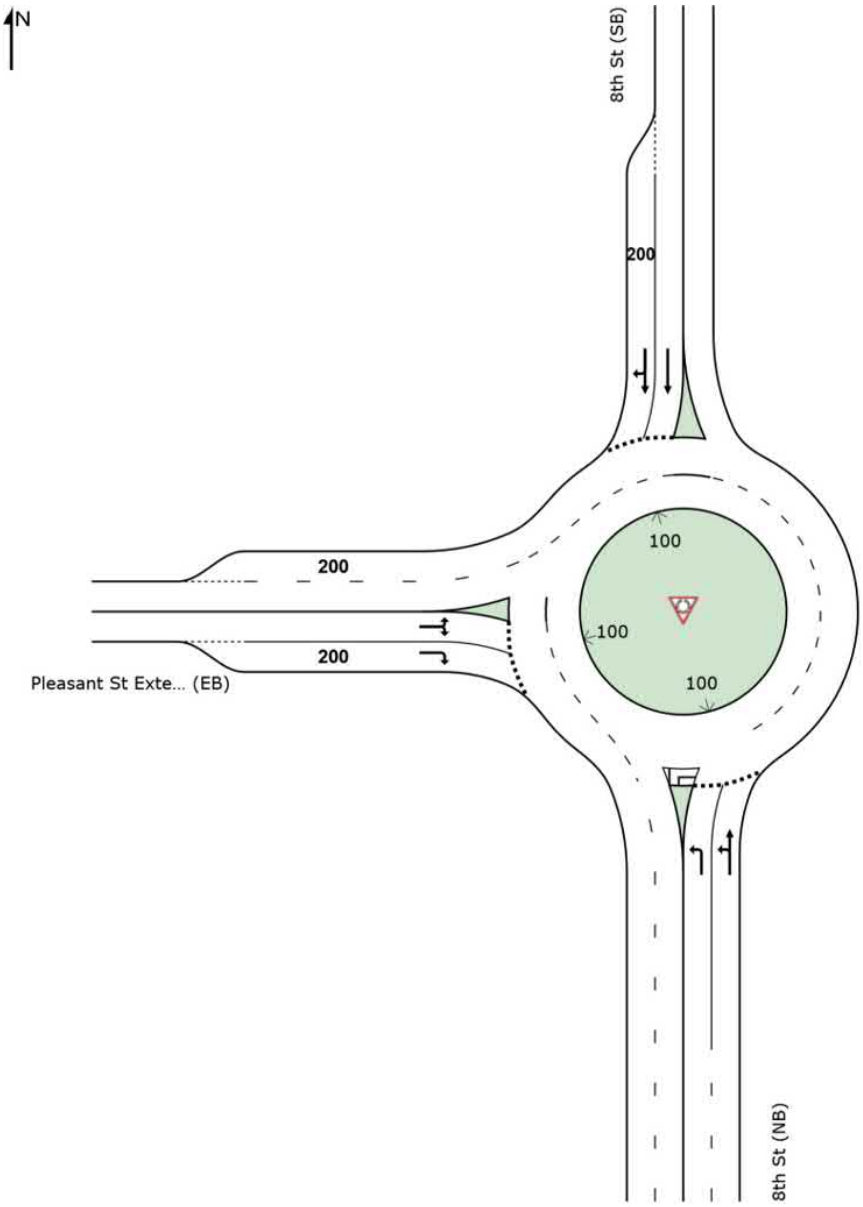
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

SITE LAYOUT

Site: [Pleasant St Extension/Walnut & 8th St - AM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



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Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension/Walnut & 8th St - AM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	663	2.0	0.371	7.1	LOS A	2.8	70.4	0.06	0.56	0.06	28.3
8	T1	326	2.0	0.235	1.3	LOS A	1.5	37.0	0.06	0.18	0.06	30.8
Approach		989	2.0	0.371	5.2	LOS A	2.8	70.4	0.06	0.43	0.06	29.0
North: 8th St (SB)												
4	T1	469	2.0	0.239	4.4	LOS A	1.2	30.2	0.56	0.53	0.56	28.6
14	R2	13	3.0	0.239	4.9	LOS A	1.2	30.2	0.56	0.51	0.56	28.2
Approach		481	2.0	0.239	4.4	LOS A	1.2	30.2	0.56	0.53	0.56	28.6
West: Pleasant St Extension (EB)												
5	L2	6	0.0	0.325	8.4	LOS A	1.4	37.9	0.50	0.56	0.50	29.9
12	R2	667	11.0	0.325	3.8	LOS A	1.4	39.1	0.49	0.53	0.49	27.7
Approach		673	10.9	0.325	3.8	LOS A	1.4	39.1	0.49	0.53	0.49	27.8
All Vehicles		2143	4.8	0.371	4.6	LOS A	2.8	70.4	0.31	0.49	0.31	28.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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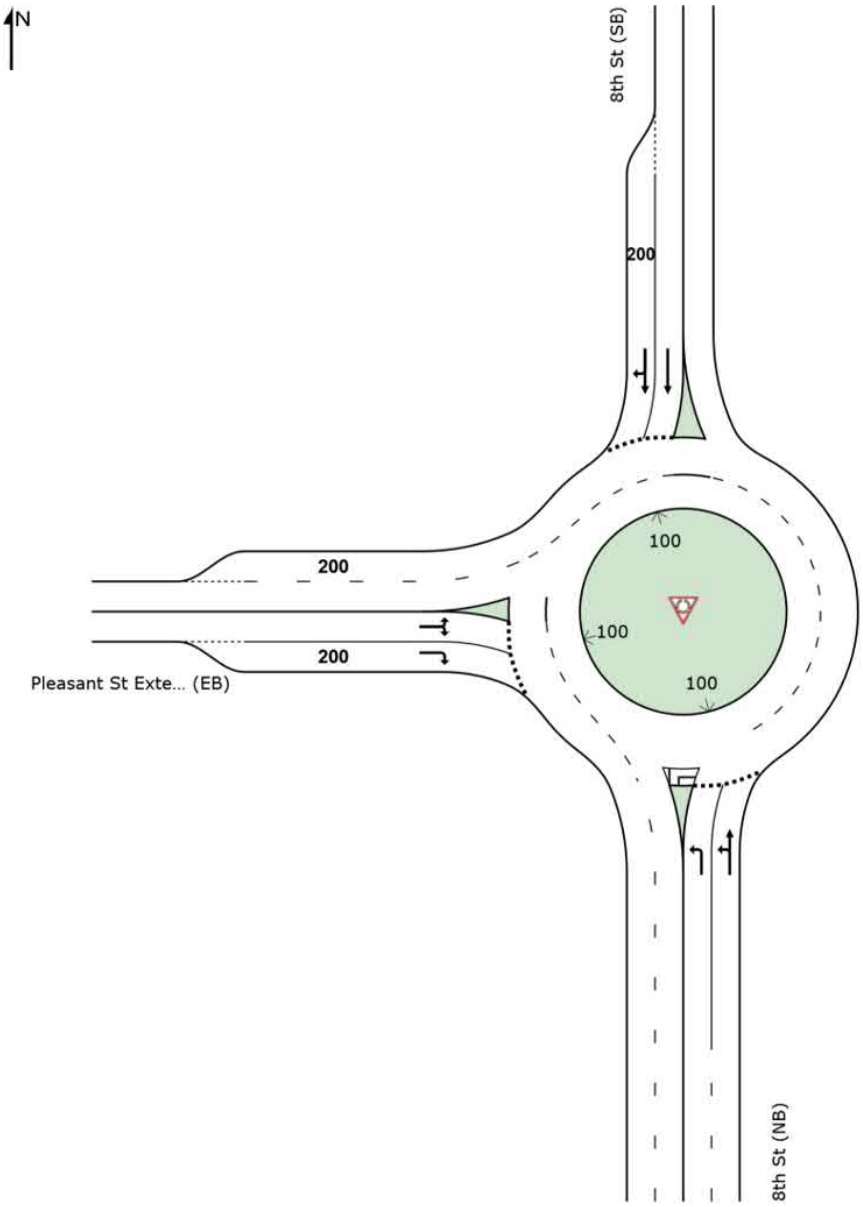
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

SITE LAYOUT

Site: [Pleasant St Extension/Walnut & 8th St - PM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



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Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

MOVEMENT SUMMARY

Site: [Pleasant St Extension/Walnut & 8th St - PM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	957	3.0	0.552	7.2	LOS A	5.7	146.4	0.09	0.55	0.09	28.1
8	T1	639	3.0	0.439	1.3	LOS A	3.7	95.5	0.09	0.16	0.09	30.8
Approach		1596	3.0	0.552	4.8	LOS A	5.7	146.4	0.09	0.40	0.09	29.1
North: 8th St (SB)												
4	T1	589	3.0	0.411	9.4	LOS A	2.9	74.5	0.82	0.88	0.90	26.6
14	R2	13	3.0	0.411	9.4	LOS A	2.9	74.5	0.83	0.86	0.88	27.1
Approach		602	3.0	0.411	9.4	LOS A	2.9	74.5	0.82	0.88	0.90	26.6
West: Pleasant St Extension (EB)												
5	L2	7	3.0	0.513	9.5	LOS A	3.0	77.1	0.65	0.71	0.72	29.6
12	R2	1052	3.0	0.513	4.4	LOS A	3.1	80.0	0.65	0.66	0.70	27.4
Approach		1059	3.0	0.513	4.5	LOS A	3.1	80.0	0.65	0.66	0.70	27.4
All Vehicles		3257	3.0	0.552	5.5	LOS A	5.7	146.4	0.41	0.57	0.44	28.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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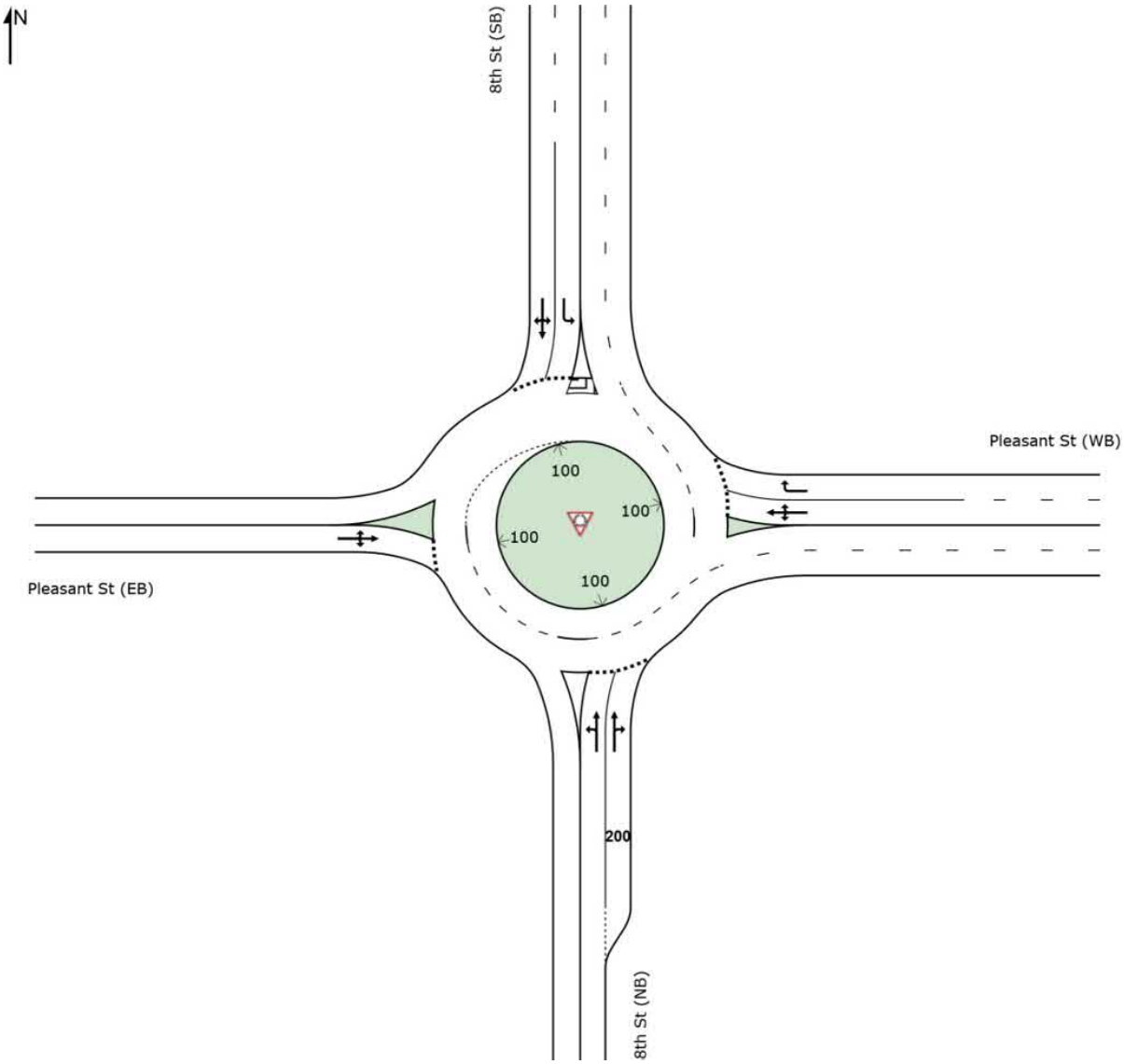
SITE LAYOUT

Site: [Pleasant St & 8th St - AM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



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Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

MOVEMENT SUMMARY

Site: [Pleasant St & 8th St - AM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	1	0.0	0.241	7.1	LOS A	1.2	31.1	0.52	0.46	0.52	27.6
8	T1	448	5.0	0.241	3.7	LOS A	1.2	33.0	0.52	0.46	0.52	28.6
18	R2	41	39.0	0.241	4.2	LOS A	1.2	33.0	0.52	0.45	0.52	26.4
Approach		490	7.8	0.241	3.7	LOS A	1.2	33.0	0.52	0.46	0.52	28.4
East: Pleasant St (WB)												
1	L2	41	46.0	0.305	8.5	LOS A	1.4	36.4	0.51	0.52	0.51	28.3
6	T1	17	14.0	0.305	1.9	LOS A	1.4	36.4	0.51	0.52	0.51	23.5
16	R2	597	2.0	0.305	2.5	LOS A	1.4	36.3	0.50	0.45	0.50	24.3
Approach		654	5.0	0.305	2.9	LOS A	1.4	36.4	0.50	0.46	0.50	24.7
North: 8th St (SB)												
7	L2	440	2.0	0.324	5.7	LOS A	2.1	54.6	0.28	0.50	0.28	24.4
4	T1	755	3.0	0.462	1.9	LOS A	3.7	95.4	0.31	0.23	0.31	29.8
14	R2	4	13.0	0.462	1.6	LOS A	3.7	95.4	0.31	0.23	0.31	25.3
Approach		1199	2.7	0.462	3.3	LOS A	3.7	95.4	0.30	0.33	0.30	28.3
West: Pleasant St (EB)												
5	L2	1	0.0	0.026	8.2	LOS A	0.1	2.7	0.60	0.55	0.60	25.8
2	T1	10	11.0	0.026	3.8	LOS A	0.1	2.7	0.60	0.55	0.60	24.8
12	R2	7	0.0	0.026	3.9	LOS A	0.1	2.7	0.60	0.55	0.60	26.1
Approach		19	6.1	0.026	4.1	LOS A	0.1	2.7	0.60	0.55	0.60	25.4
All Vehicles		2361	4.4	0.462	3.3	LOS A	3.7	95.4	0.40	0.39	0.40	27.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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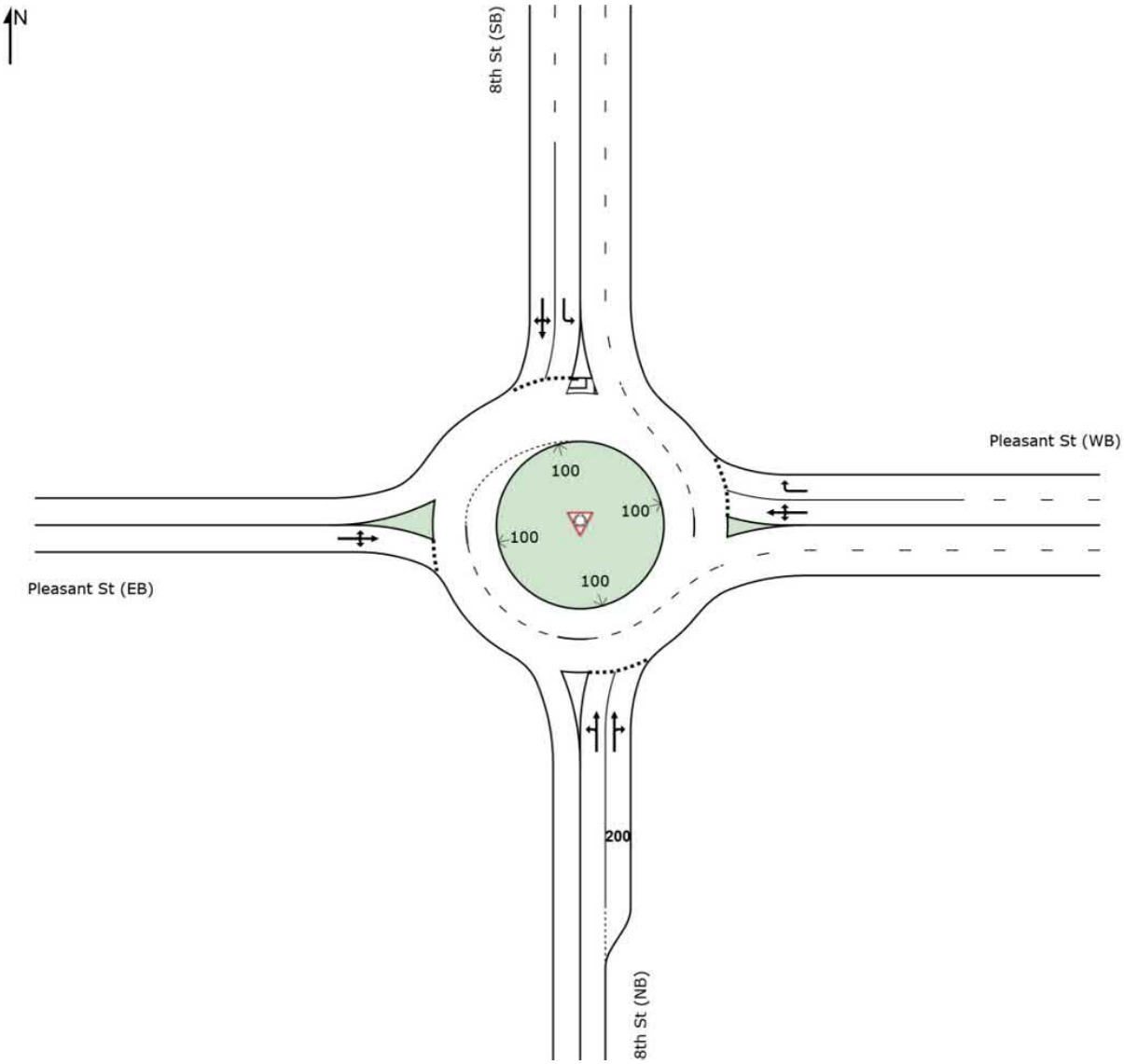
SITE LAYOUT

Site: [Pleasant St & 8th St - PM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



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Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

MOVEMENT SUMMARY

Site: [Pleasant St & 8th St - PM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 8th St (NB)												
3	L2	15	0.0	0.436	10.2	LOS B	2.5	62.2	0.73	0.85	0.85	26.9
8	T1	678	1.0	0.436	6.2	LOS A	2.6	66.6	0.73	0.79	0.83	27.7
18	R2	39	0.0	0.436	5.3	LOS A	2.6	66.6	0.73	0.74	0.82	25.8
Approach		732	0.9	0.436	6.3	LOS A	2.6	66.6	0.73	0.79	0.83	27.5
East: Pleasant St (WB)												
1	L2	27	30.0	0.468	9.6	LOS A	2.6	67.0	0.67	0.73	0.74	28.1
6	T1	9	20.0	0.468	3.7	LOS A	2.6	67.0	0.67	0.73	0.74	23.3
16	R2	869	1.0	0.468	3.5	LOS A	2.7	69.2	0.67	0.64	0.72	23.7
Approach		904	2.0	0.468	3.7	LOS A	2.7	69.2	0.67	0.65	0.72	23.9
North: 8th St (SB)												
7	L2	1036	1.0	0.561	5.7	LOS A	5.3	133.7	0.32	0.45	0.32	25.0
4	T1	727	1.0	0.561	1.8	LOS A	5.3	133.7	0.30	0.31	0.30	29.1
14	R2	4	0.0	0.561	1.4	LOS A	5.3	133.7	0.30	0.31	0.30	24.8
Approach		1767	1.0	0.561	4.1	LOS A	5.3	133.7	0.31	0.39	0.31	27.1
West: Pleasant St (EB)												
5	L2	3	0.0	0.018	9.4	LOS A	0.1	1.9	0.68	0.67	0.68	25.0
2	T1	2	0.0	0.018	4.5	LOS A	0.1	1.9	0.68	0.67	0.68	24.1
12	R2	6	0.0	0.018	5.1	LOS A	0.1	1.9	0.68	0.67	0.68	25.5
Approach		12	0.0	0.018	6.2	LOS A	0.1	1.9	0.68	0.67	0.68	25.2
All Vehicles		3415	1.3	0.561	4.5	LOS A	5.3	133.7	0.50	0.55	0.53	26.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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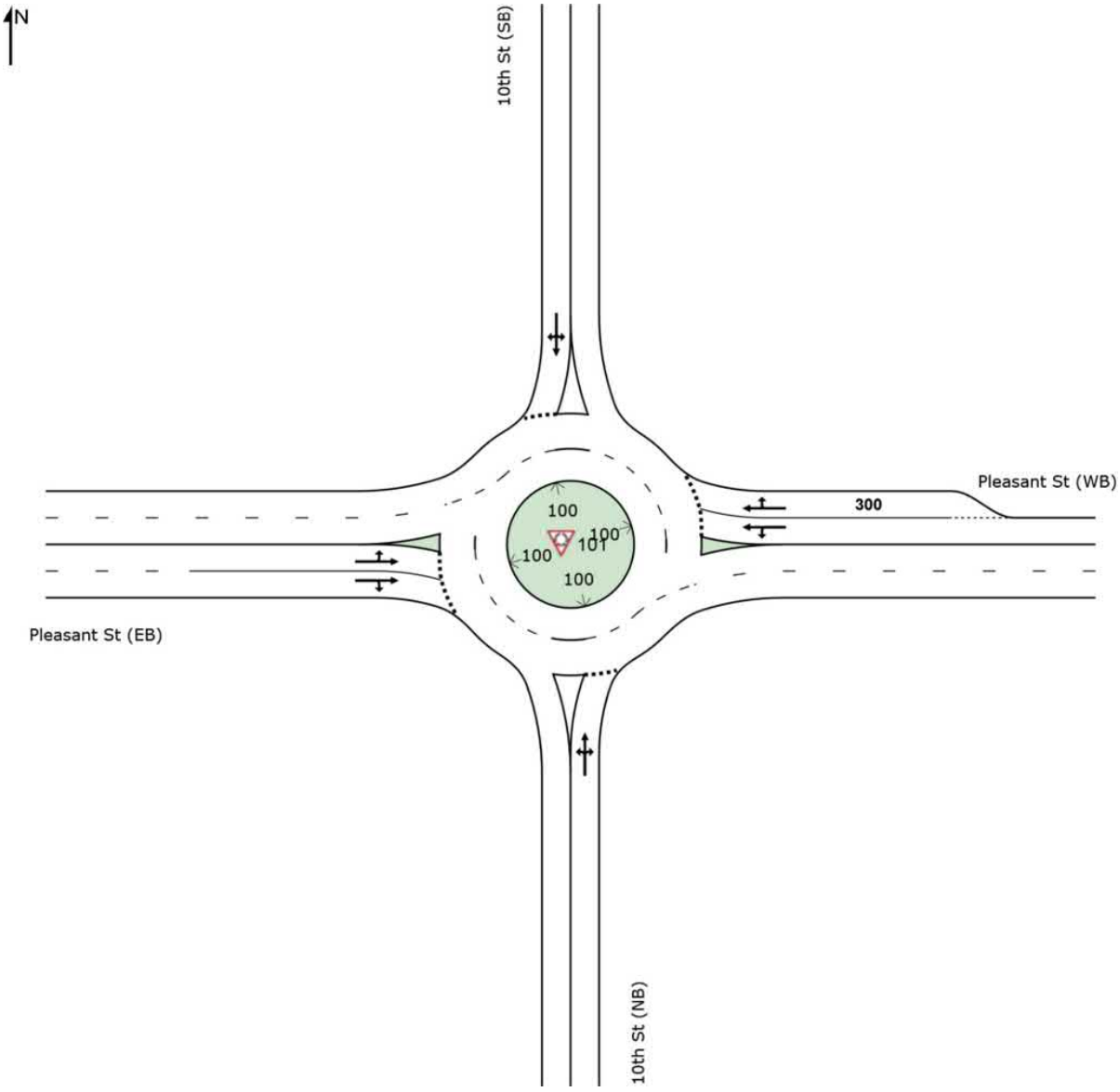
SITE LAYOUT

Site: 101 [Pleasant St & 10th St - AM 2045]

Design Year 2045
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



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Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

MOVEMENT SUMMARY

Site: 101 [Pleasant St & 10th St - AM 2045]

Design Year 2045
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 10th St (NB)												
3	L2	148	3.0	0.401	6.9	LOS A	1.8	47.0	0.51	0.47	0.51	25.5
8	T1	205	2.2	0.401	1.8	LOS A	1.8	47.0	0.51	0.47	0.51	24.8
18	R2	56	3.0	0.401	2.6	LOS A	1.8	47.0	0.51	0.47	0.51	24.2
Approach		410	2.6	0.401	3.7	LOS A	1.8	47.0	0.51	0.47	0.51	24.9
East: Pleasant St (WB)												
1	L2	7	3.0	0.225	6.8	LOS A	1.1	30.1	0.49	0.28	0.49	25.7
6	T1	425	7.5	0.225	1.7	LOS A	1.2	31.2	0.48	0.27	0.48	25.3
16	R2	54	5.0	0.225	2.5	LOS A	1.2	31.2	0.48	0.27	0.48	24.5
Approach		486	7.2	0.225	1.8	LOS A	1.2	31.2	0.48	0.27	0.48	25.2
North: 10th St (SB)												
7	L2	69	2.6	0.408	7.4	LOS A	1.9	48.8	0.56	0.46	0.58	25.4
4	T1	276	2.6	0.408	2.3	LOS A	1.9	48.8	0.56	0.46	0.58	24.9
14	R2	49	3.0	0.408	3.1	LOS A	1.9	48.8	0.56	0.46	0.58	23.9
Approach		395	2.7	0.408	3.3	LOS A	1.9	48.8	0.56	0.46	0.58	24.9
West: Pleasant St (EB)												
5	L2	13	3.0	0.215	6.7	LOS A	1.1	28.4	0.48	0.27	0.48	26.0
2	T1	371	4.3	0.215	1.5	LOS A	1.1	29.5	0.48	0.27	0.48	25.3
12	R2	97	4.5	0.215	2.4	LOS A	1.1	29.5	0.47	0.28	0.47	24.3
Approach		481	4.3	0.215	1.9	LOS A	1.1	29.5	0.47	0.28	0.47	25.1
All Vehicles		1771	4.3	0.408	2.6	LOS A	1.9	48.8	0.50	0.36	0.51	25.0

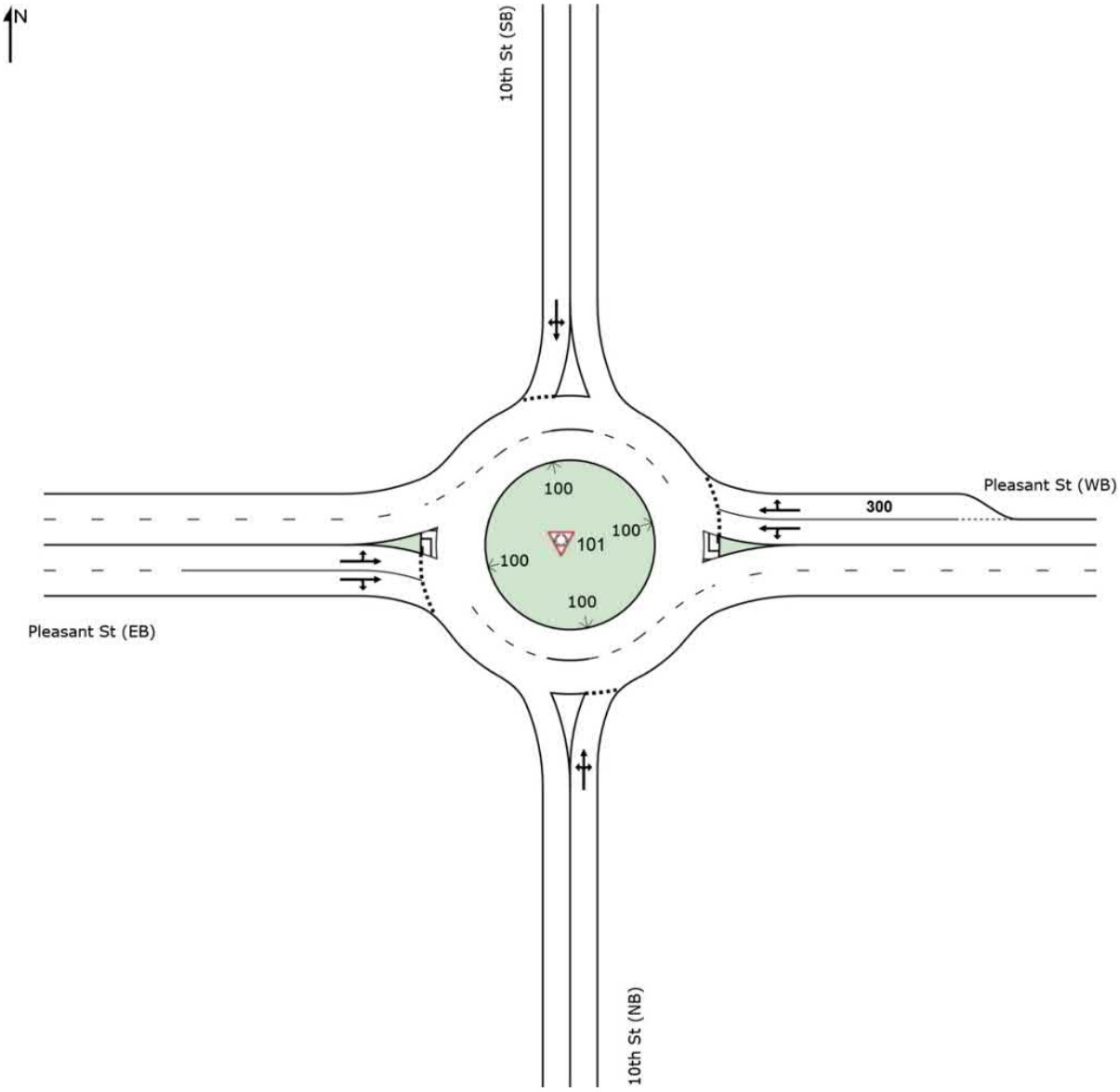
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Sunday, April 05, 2020 10:11:44 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

SITE LAYOUT

Site: 101 [Pleasant St & 10th St - PM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, April 23, 2020 6:58:36 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

MOVEMENT SUMMARY

Site: 101 [Pleasant St & 10th St - PM 2045]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 10th St (NB)												
3	L2	83	0.0	0.921	18.0	LOS D	11.4	284.4	0.95	1.44	1.93	22.2
8	T1	487	0.0	0.921	12.9	LOS D	11.4	284.4	0.95	1.44	1.93	22.6
18	R2	145	0.0	0.921	13.7	LOS D	11.4	284.4	0.95	1.44	1.93	22.1
Approach		716	0.0	0.921	13.6	LOS B	11.4	284.4	0.95	1.44	1.93	22.4
East: Pleasant St (WB)												
1	L2	7	0.0	0.511	9.6	LOS A	4.5	114.3	0.86	0.74	0.94	25.0
6	T1	789	3.0	0.511	4.0	LOS A	4.8	122.7	0.87	0.68	0.92	24.3
16	R2	172	3.0	0.511	4.4	LOS A	4.8	122.7	0.87	0.60	0.90	23.9
Approach		968	3.0	0.511	4.1	LOS A	4.8	122.7	0.87	0.66	0.92	24.2
North: 10th St (SB)												
7	L2	66	0.0	0.528	8.6	LOS A	3.2	79.3	0.74	0.67	0.86	25.1
4	T1	328	1.0	0.528	3.6	LOS A	3.2	79.3	0.74	0.67	0.86	24.6
14	R2	25	1.0	0.528	4.4	LOS A	3.2	79.3	0.74	0.67	0.86	23.5
Approach		420	0.8	0.528	4.4	LOS A	3.2	79.3	0.74	0.67	0.86	24.6
West: Pleasant St (EB)												
5	L2	6	4.0	0.472	7.8	LOS A	3.5	91.4	0.71	0.40	0.71	25.4
2	T1	960	4.0	0.472	2.4	LOS A	3.8	98.9	0.70	0.38	0.70	24.7
12	R2	105	4.0	0.472	3.2	LOS A	3.8	98.9	0.69	0.36	0.69	23.7
Approach		1072	4.0	0.472	2.5	LOS A	3.8	98.9	0.70	0.38	0.70	24.6
All Vehicles		3176	2.4	0.921	5.7	LOS A	11.4	284.4	0.81	0.74	1.07	23.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

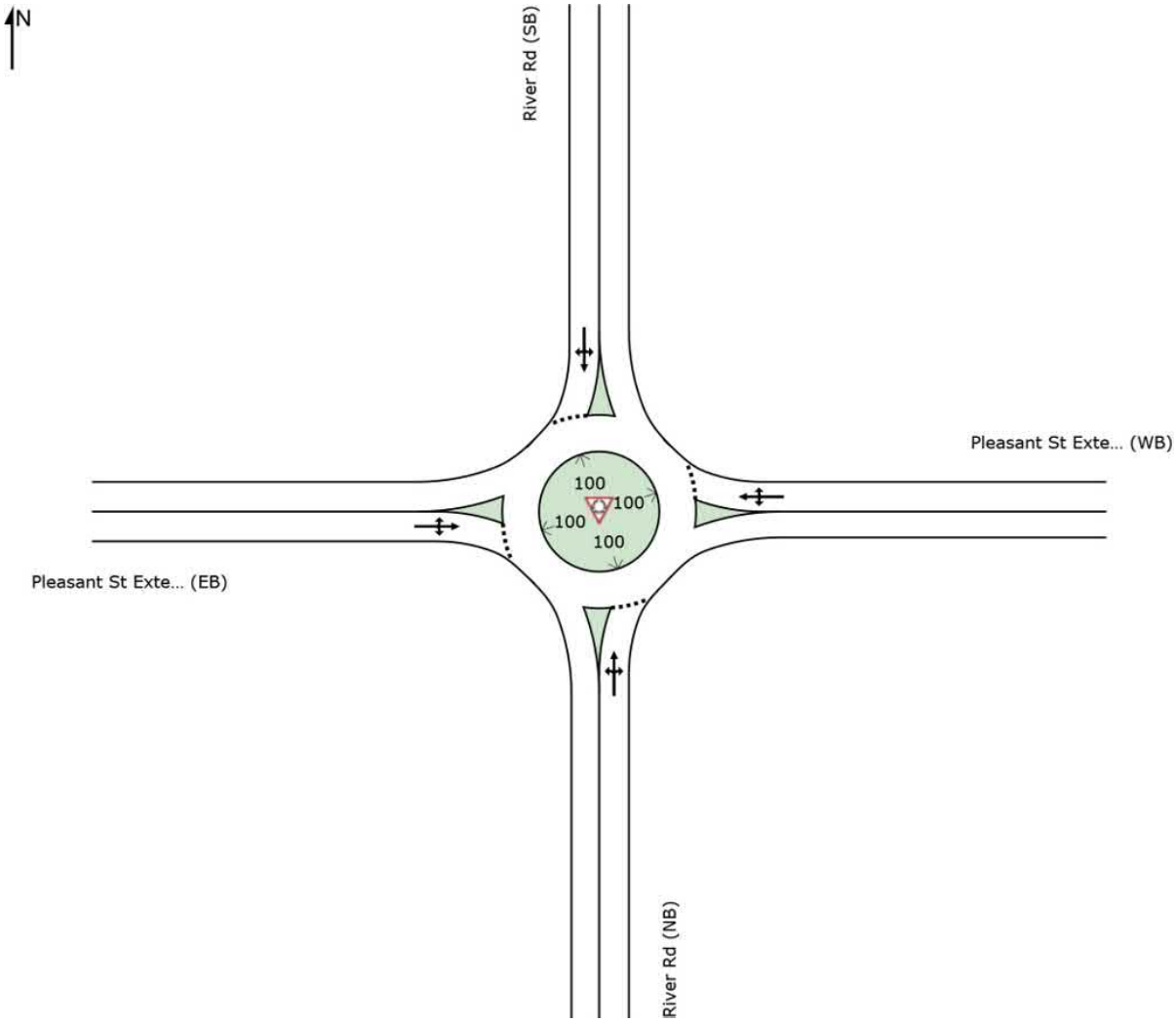
Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Sunday, April 05, 2020 10:11:45 PM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final).sip8

2.0% Annual Growth Rate
Updated Roundabout Analysis

SITE LAYOUT

Site: [Pleasant St Extension & River Rd - PM 2045 - No bypass 2.0%]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, May 28, 2020 11:37:13 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation 052720.sip8

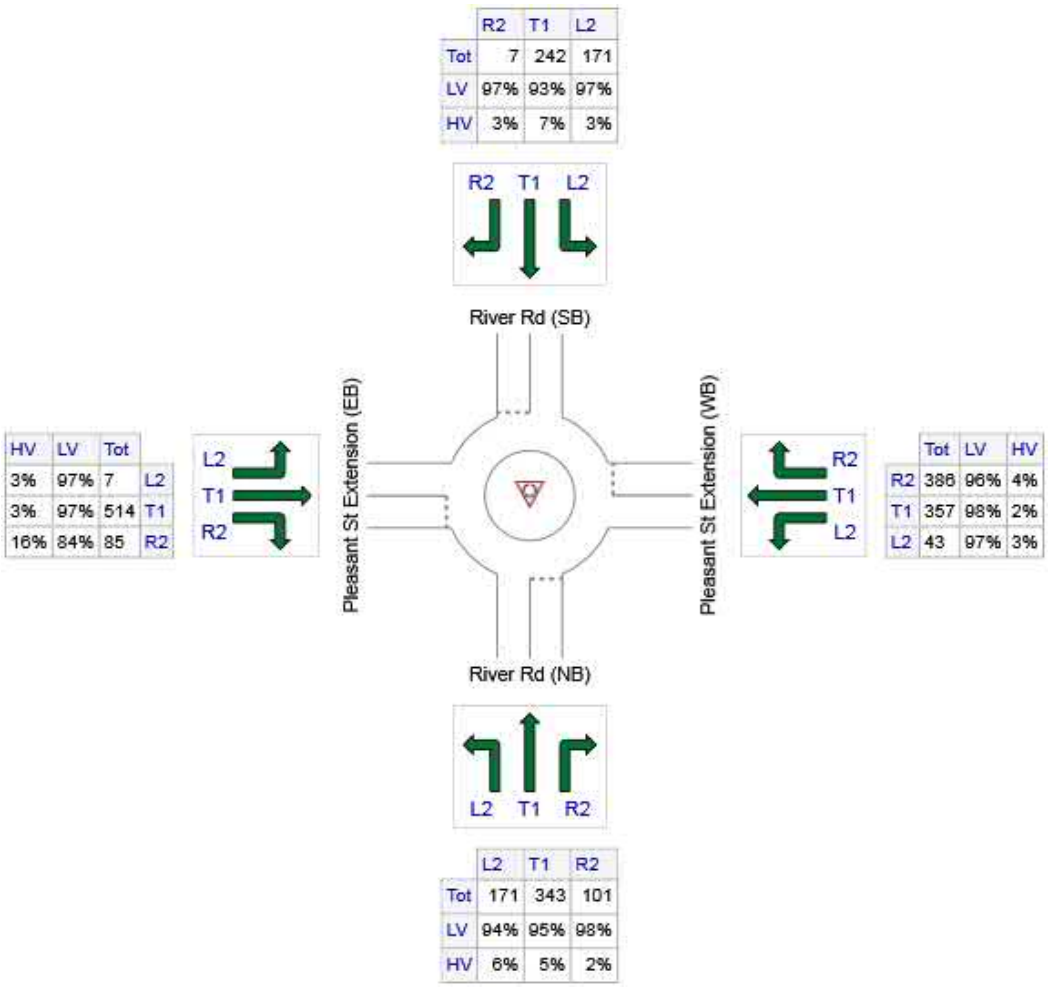
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: [Pleasant St Extension & River Rd - PM 2045 - No bypass 2.0%]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: River Rd (NB)	615	585	30
E: Pleasant St Extension (WB)	786	759	27
N: River Rd (SB)	420	397	23
W: Pleasant St Extension (EB)	606	578	28
Total	2427	2321	106

Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, May 28, 2020 11:37:11 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation

MOVEMENT SUMMARY

Site: [Pleasant St Extension & River Rd - PM 2045 - No bypass 2.0%]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: River Rd (NB)												
3	L2	186	5.7	0.929	34.6	LOS D	20.2	523.5	1.00	1.64	2.33	19.6
8	T1	373	5.2	0.929	28.9	LOS D	20.2	523.5	1.00	1.64	2.33	19.3
18	R2	110	2.1	0.929	31.0	LOS D	20.2	523.5	1.00	1.64	2.33	20.8
Approach		668	4.8	0.929	30.8	LOS C	20.2	523.5	1.00	1.64	2.33	19.6
East: Pleasant St Extension (WB)												
1	L2	47	3.4	1.027	50.1	LOS F	34.8	893.7	1.00	1.82	3.03	17.5
6	T1	388	2.4	1.027	44.0	LOS F	34.8	893.7	1.00	1.82	3.03	22.6
16	R2	420	4.3	1.027	44.3	LOS F	34.8	893.7	1.00	1.82	3.03	22.1
Approach		854	3.4	1.027	44.5	LOS D	34.8	893.7	1.00	1.82	3.03	22.1
North: River Rd (SB)												
7	L2	186	3.0	0.552	15.0	LOS B	4.9	127.2	0.86	0.92	0.99	31.8
4	T1	263	7.1	0.552	6.9	LOS A	4.9	127.2	0.86	0.92	0.99	28.2
14	R2	8	3.0	0.552	7.4	LOS A	4.9	127.2	0.86	0.92	0.99	28.0
Approach		457	5.4	0.552	10.2	LOS B	4.9	127.2	0.86	0.92	0.99	29.9
West: Pleasant St Extension (EB)												
5	L2	8	3.0	0.717	13.8	LOS B	8.6	222.5	0.92	0.99	1.19	30.8
2	T1	559	2.7	0.717	10.4	LOS B	8.6	222.5	0.92	0.99	1.19	33.8
12	R2	92	15.8	0.717	9.5	LOS A	8.6	222.5	0.92	0.99	1.19	29.2
Approach		659	4.5	0.717	10.3	LOS B	8.6	222.5	0.92	0.99	1.19	33.2
All Vehicles		2638	4.4	1.027	26.5	LOS C	34.8	893.7	0.96	1.41	2.04	24.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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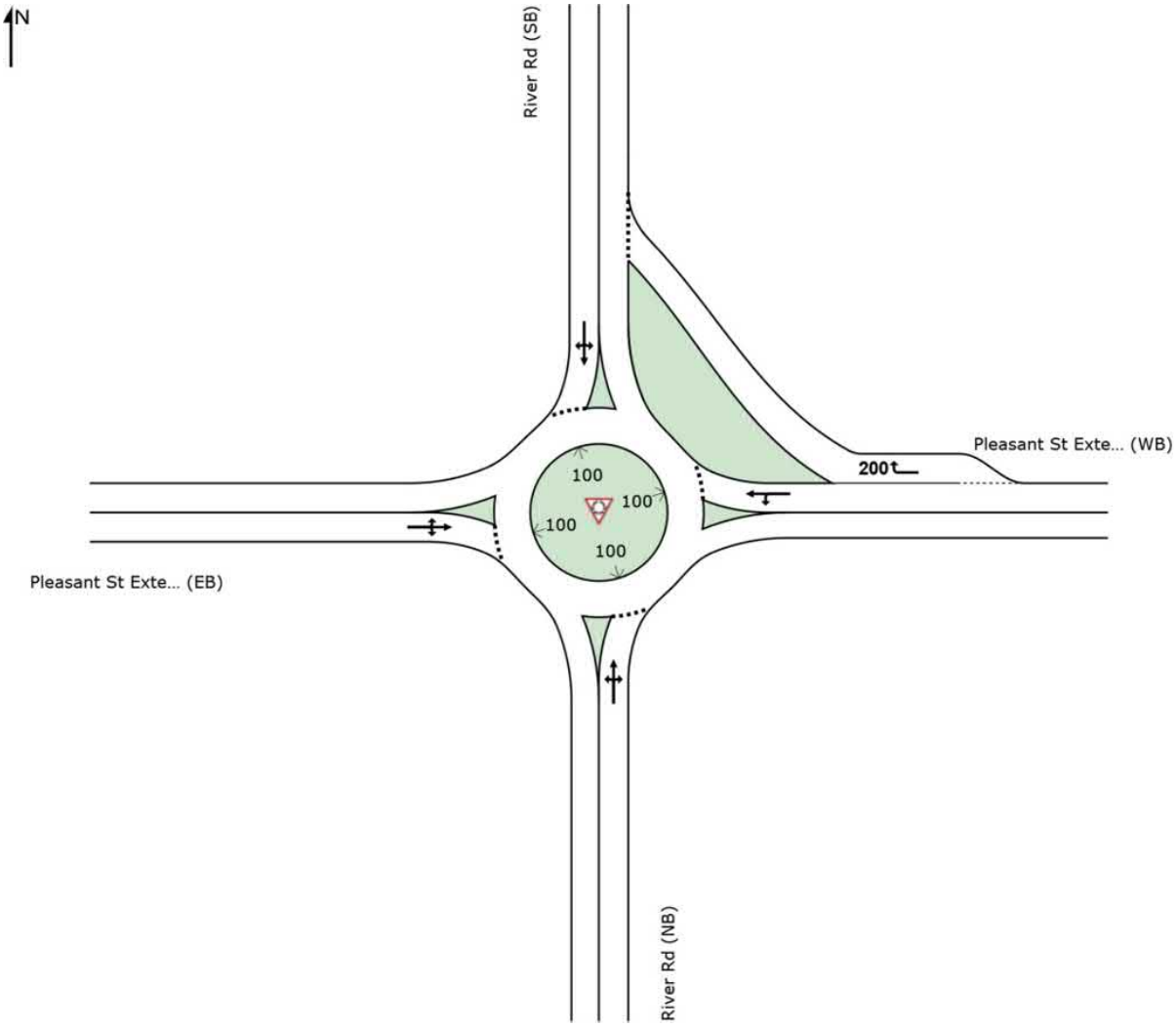
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation 052720.sip8

SITE LAYOUT

Site: [Pleasant St Extension & River Rd - PM 2045 - Bypass 2.0%]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, May 28, 2020 11:37:17 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation 052720.sip8

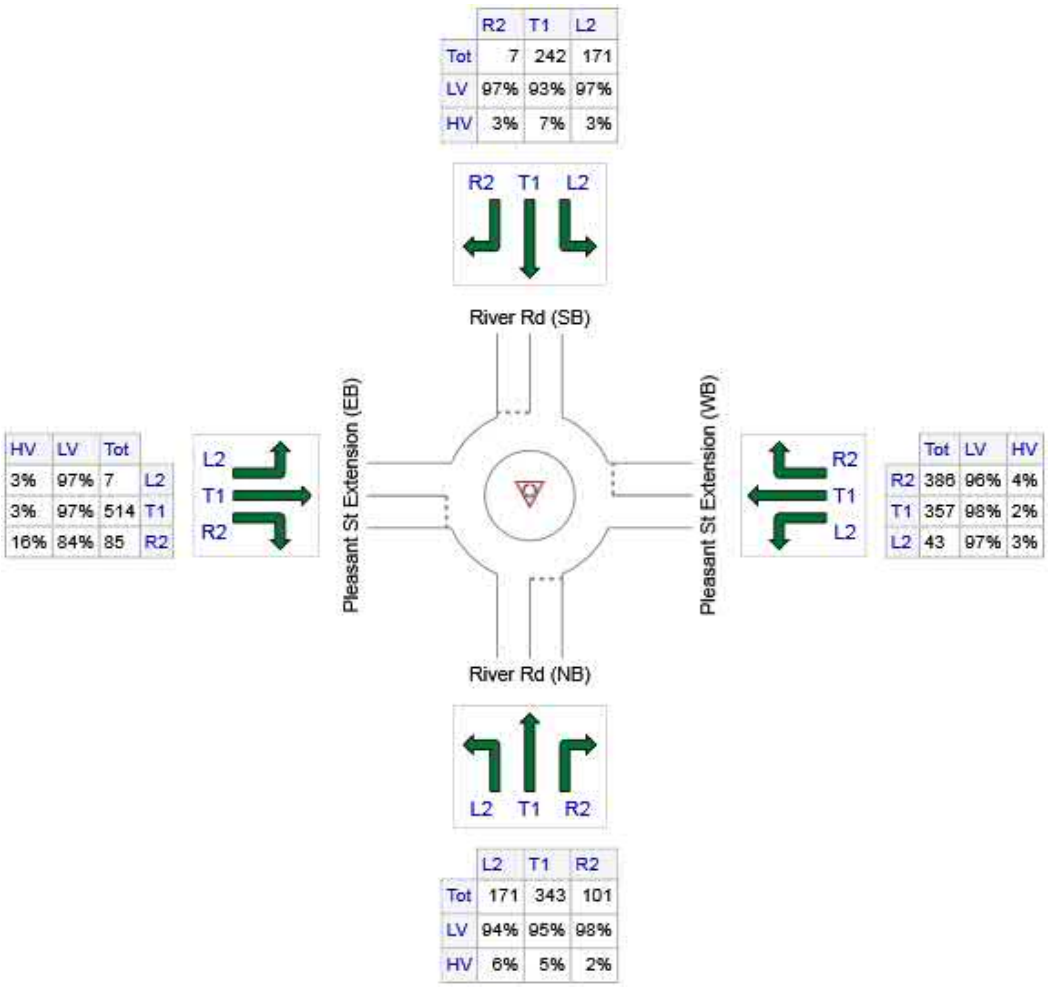
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: [Pleasant St Extension & River Rd - PM 2045 - Bypass 2.0%]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: River Rd (NB)	615	585	30
E: Pleasant St Extension (WB)	786	759	27
N: River Rd (SB)	420	397	23
W: Pleasant St Extension (EB)	606	578	28
Total	2427	2321	106

Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, May 28, 2020 11:37:16 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation

MOVEMENT SUMMARY

Site: [Pleasant St Extension & River Rd - PM 2045 - Bypass 2.0%]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: River Rd (NB)												
3	L2	186	5.7	0.928	34.4	LOS D	20.1	520.9	1.00	1.64	2.32	19.6
8	T1	373	5.2	0.928	28.7	LOS D	20.1	520.9	1.00	1.64	2.32	19.4
18	R2	110	2.1	0.928	30.8	LOS D	20.1	520.9	1.00	1.64	2.32	20.9
Approach		668	4.8	0.928	30.6	LOS C	20.1	520.9	1.00	1.64	2.32	19.7
East: Pleasant St Extension (WB)												
1	L2	47	3.4	0.412	12.3	LOS B	3.5	88.0	0.82	0.65	0.82	30.5
6	T1	388	2.4	0.412	6.3	LOS A	3.5	88.0	0.82	0.65	0.82	35.0
16	R2	420	4.3	0.339	5.4	LOS A	2.5	64.8	0.64	0.64	0.64	35.2
Approach		854	3.4	0.412	6.2	LOS A	3.5	88.0	0.73	0.65	0.73	34.9
North: River Rd (SB)												
7	L2	186	3.0	0.540	14.9	LOS B	4.6	121.2	0.84	0.91	0.97	31.8
4	T1	263	7.1	0.540	6.9	LOS A	4.6	121.2	0.84	0.91	0.97	28.2
14	R2	8	3.0	0.540	7.3	LOS A	4.6	121.2	0.84	0.91	0.97	28.1
Approach		457	5.4	0.540	10.2	LOS B	4.6	121.2	0.84	0.91	0.97	29.9
West: Pleasant St Extension (EB)												
5	L2	8	3.0	0.714	13.7	LOS B	8.5	220.5	0.92	0.98	1.18	30.9
2	T1	559	2.7	0.714	10.3	LOS B	8.5	220.5	0.92	0.98	1.18	33.8
12	R2	92	15.8	0.714	9.5	LOS A	8.5	220.5	0.92	0.98	1.18	29.3
Approach		659	4.5	0.714	10.3	LOS B	8.5	220.5	0.92	0.98	1.18	33.2
All Vehicles		2638	4.4	0.928	14.1	LOS B	20.1	520.9	0.87	1.03	1.29	29.3

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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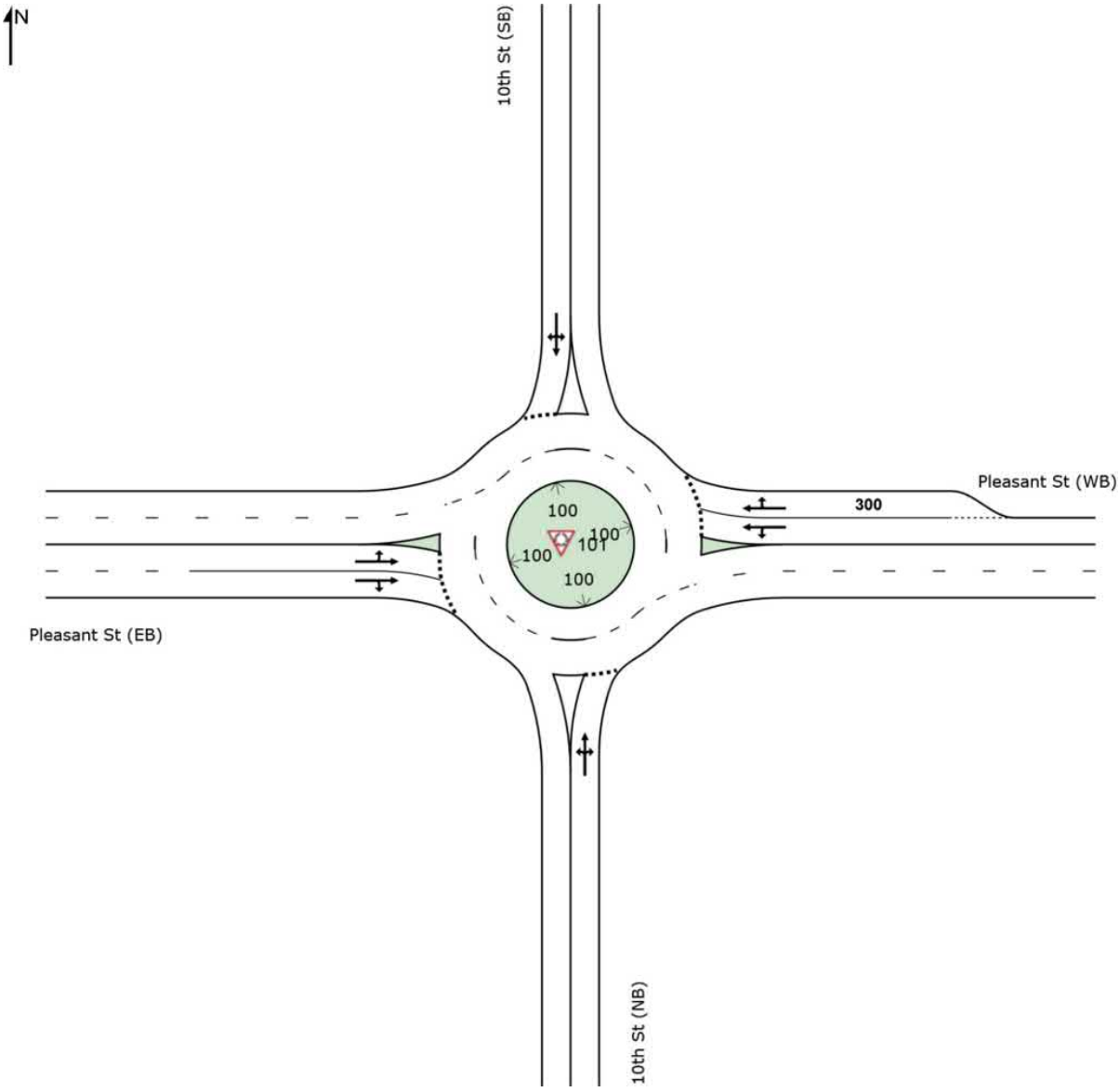
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation 052720.sip8

SITE LAYOUT

Site: 101 [Pleasant St & 10th St - AM 2045 - 2.0%]

Design Year 2045
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, May 28, 2020 11:38:34 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation 052720.sip8

MOVEMENT SUMMARY

Site: 101 [Pleasant St & 10th St - AM 2045 - 2.0%]

Design Year 2045
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 10th St (NB)												
3	L2	169	3.0	0.474	7.5	LOS A	2.5	63.6	0.58	0.57	0.62	25.3
8	T1	234	2.2	0.474	2.4	LOS A	2.5	63.6	0.58	0.57	0.62	24.7
18	R2	64	3.0	0.474	3.2	LOS A	2.5	63.6	0.58	0.57	0.62	24.0
Approach		467	2.6	0.474	4.3	LOS A	2.5	63.6	0.58	0.57	0.62	24.8
East: Pleasant St (WB)												
1	L2	8	3.0	0.270	7.1	LOS A	1.4	38.3	0.55	0.33	0.55	25.6
6	T1	486	7.5	0.270	2.0	LOS A	1.5	40.1	0.55	0.32	0.55	25.1
16	R2	62	5.0	0.270	2.8	LOS A	1.5	40.1	0.54	0.31	0.54	24.4
Approach		555	7.2	0.270	2.2	LOS A	1.5	40.1	0.54	0.32	0.54	25.0
North: 10th St (SB)												
7	L2	79	2.6	0.489	8.1	LOS A	2.6	67.5	0.63	0.59	0.71	25.3
4	T1	315	2.6	0.489	3.0	LOS A	2.6	67.5	0.63	0.59	0.71	24.8
14	R2	56	3.0	0.489	3.9	LOS A	2.6	67.5	0.63	0.59	0.71	23.7
Approach		451	2.6	0.489	4.0	LOS A	2.6	67.5	0.63	0.59	0.71	24.8
West: Pleasant St (EB)												
5	L2	15	3.0	0.258	7.0	LOS A	1.4	36.2	0.54	0.31	0.54	25.9
2	T1	424	4.3	0.258	1.8	LOS A	1.5	37.9	0.54	0.32	0.54	25.1
12	R2	111	4.5	0.258	2.7	LOS A	1.5	37.9	0.53	0.33	0.53	24.1
Approach		551	4.3	0.258	2.1	LOS A	1.5	37.9	0.53	0.32	0.53	24.9
All Vehicles		2023	4.3	0.489	3.1	LOS A	2.6	67.5	0.57	0.44	0.60	24.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Wednesday, May 27, 2020 11:35:17 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation 052720.sip8

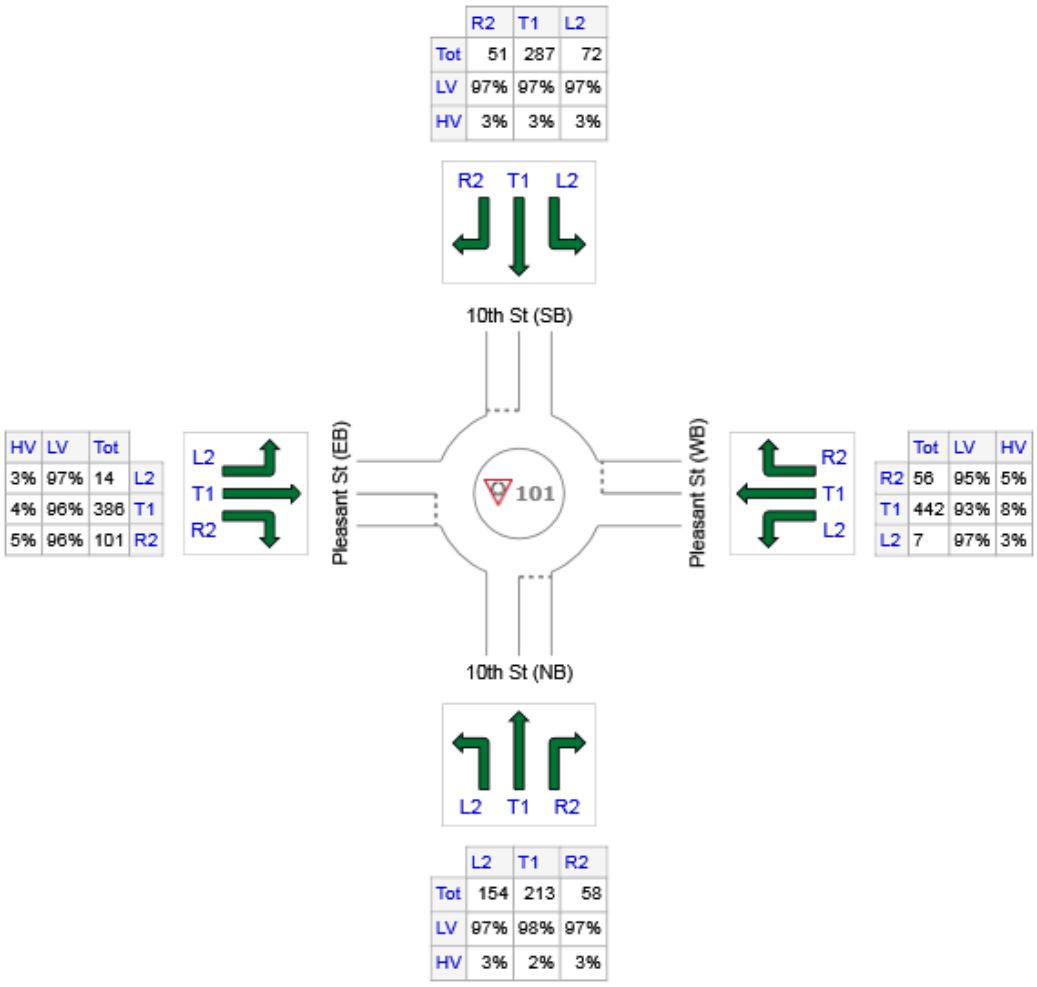
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Pleasant St & 10th St - AM 2045 - 2.0%]

Design Year 2045
AM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Volume Display Method: Total and %



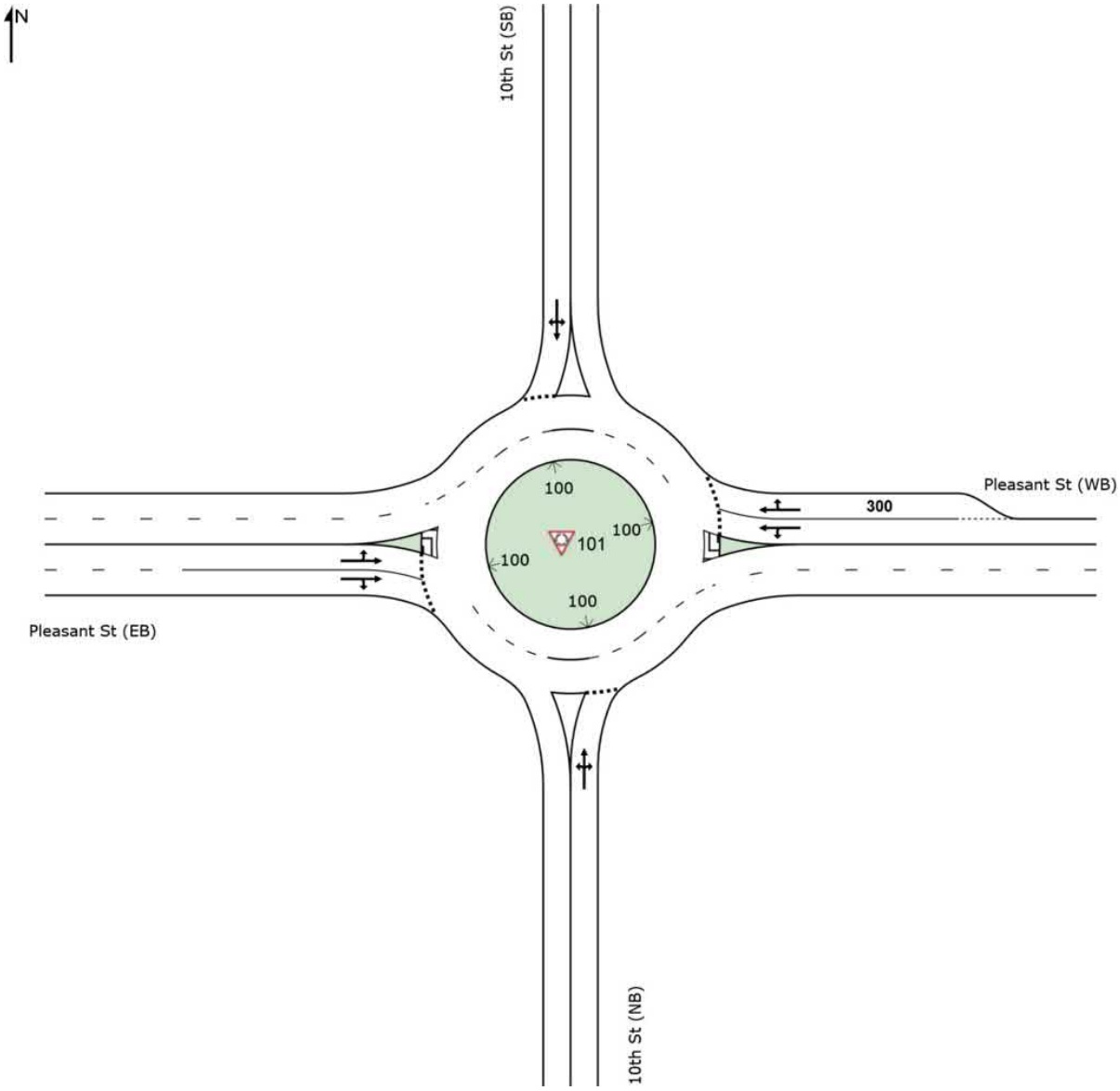
	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: 10th St (NB)	425	414	11
E: Pleasant St (WB)	505	469	36
N: 10th St (SB)	410	399	11
W: Pleasant St (EB)	501	479	22
Total	1841	1761	80

Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, May 28, 2020 11:38:33 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation

SITE LAYOUT

Site: 101 [Pleasant St & 10th St - PM 2045 - SL 2.0%]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, May 28, 2020 11:37:20 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation 052720.sip8

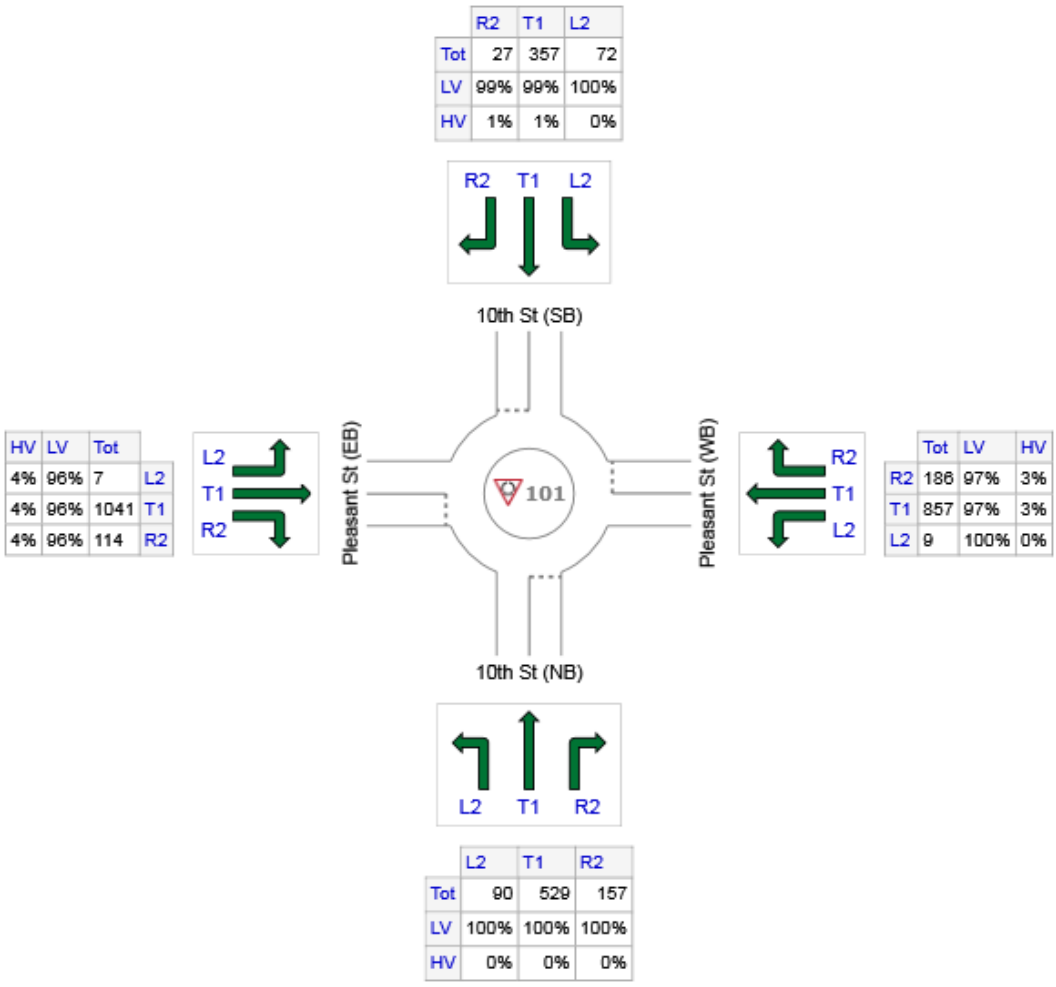
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Pleasant St & 10th St - PM 2045 - SL 2.0%]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: 10th St (NB)	776	776	0
E: Pleasant St (WB)	1052	1021	31
N: 10th St (SB)	456	452	4
W: Pleasant St (EB)	1162	1116	46
Total	3446	3364	82

Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, May 28, 2020 11:37:19 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation

MOVEMENT SUMMARY

Site: 101 [Pleasant St & 10th St - PM 2045 - SL 2.0%]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 10th St (NB)												
3	L2	95	0.0	1.196	103.1	LOS F	53.0	1325.8	1.00	4.02	7.35	10.0
8	T1	557	0.0	1.196	98.0	LOS F	53.0	1325.8	1.00	4.02	7.35	12.2
18	R2	165	0.0	1.196	98.8	LOS F	53.0	1325.8	1.00	4.02	7.35	12.0
Approach		817	0.0	1.196	98.7	LOS F	53.0	1325.8	1.00	4.02	7.35	12.0
East: Pleasant St (WB)												
1	L2	9	0.0	0.584	10.3	LOS B	5.6	143.4	0.89	0.89	1.03	24.9
6	T1	902	3.0	0.584	4.7	LOS A	6.1	155.6	0.89	0.80	1.01	24.2
16	R2	196	3.0	0.584	5.1	LOS A	6.1	155.6	0.89	0.71	0.98	23.8
Approach		1107	3.0	0.584	4.8	LOS A	6.1	155.6	0.89	0.79	1.00	24.1
North: 10th St (SB)												
7	L2	76	0.0	0.660	10.1	LOS B	4.5	114.0	0.83	0.91	1.06	24.9
4	T1	376	1.0	0.660	5.1	LOS A	4.5	114.0	0.83	0.91	1.06	24.4
14	R2	28	1.0	0.660	5.9	LOS A	4.5	114.0	0.83	0.91	1.06	23.2
Approach		480	0.8	0.660	5.9	LOS A	4.5	114.0	0.83	0.91	1.06	24.4
West: Pleasant St (EB)												
5	L2	7	4.0	0.576	9.4	LOS A	5.3	137.6	0.82	0.71	0.91	25.1
2	T1	1096	4.0	0.576	3.7	LOS A	5.6	144.2	0.81	0.62	0.88	24.4
12	R2	120	4.0	0.576	4.2	LOS A	5.6	144.2	0.81	0.54	0.86	23.5
Approach		1223	4.0	0.576	3.8	LOS A	5.6	144.2	0.81	0.61	0.88	24.3
All Vehicles		3627	2.4	1.196	25.8	LOS C	53.0	1325.8	0.88	1.47	2.40	19.0

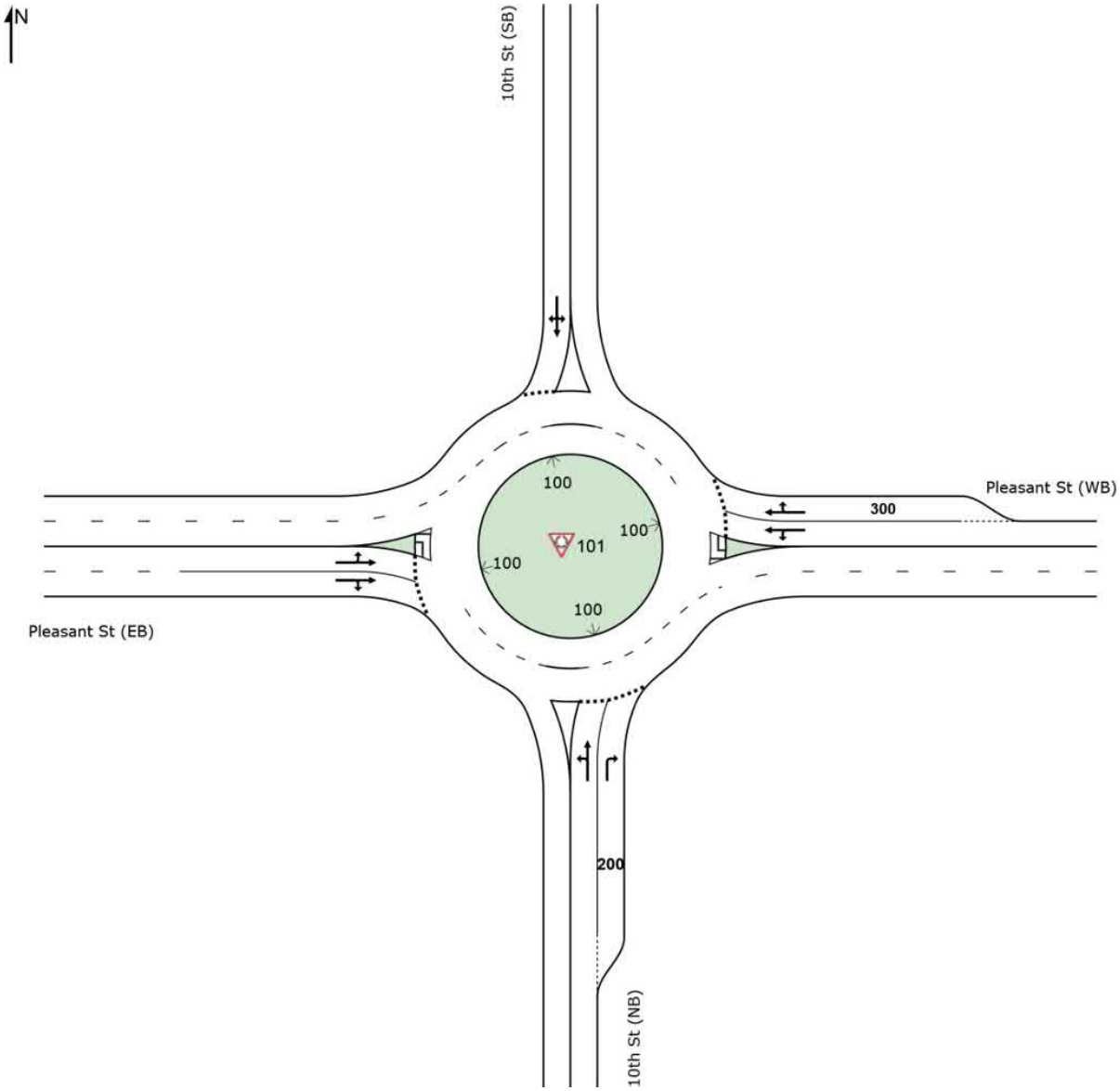
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Wednesday, May 27, 2020 11:30:06 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation 052720.sip8

SITE LAYOUT

Site: 101 [Pleasant St & 10th St - PM 2045 - 2.0% add NBRTL]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout



Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, May 28, 2020 11:37:23 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation 052720.sip8

MOVEMENT SUMMARY

Site: 101 [Pleasant St & 10th St - PM 2045 - 2.0% add NBRTL]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 10th St (NB)												
3	L2	95	0.0	0.747	10.5	LOS B	6.2	154.7	0.89	1.00	1.21	24.7
8	T1	557	0.0	0.747	5.4	LOS A	6.2	154.7	0.89	1.00	1.21	24.3
18	R2	165	0.0	0.280	4.4	LOS A	1.2	31.0	0.71	0.74	0.71	24.2
Approach		817	0.0	0.747	5.8	LOS A	6.2	154.7	0.85	0.95	1.11	24.3
East: Pleasant St (WB)												
1	L2	9	0.0	0.635	12.8	LOS B	6.8	172.9	0.96	1.06	1.20	24.4
6	T1	902	3.0	0.635	7.0	LOS A	7.5	192.9	0.97	1.02	1.19	23.7
16	R2	196	3.0	0.635	7.2	LOS A	7.5	192.9	0.97	0.98	1.17	23.6
Approach		1107	3.0	0.635	7.1	LOS A	7.5	192.9	0.97	1.02	1.18	23.7
North: 10th St (SB)												
7	L2	76	0.0	0.675	10.4	LOS B	4.8	120.5	0.85	0.94	1.09	24.8
4	T1	376	1.0	0.675	5.3	LOS A	4.8	120.5	0.85	0.94	1.09	24.3
14	R2	28	1.0	0.675	6.1	LOS A	4.8	120.5	0.85	0.94	1.09	23.2
Approach		480	0.8	0.675	6.2	LOS A	4.8	120.5	0.85	0.94	1.09	24.4
West: Pleasant St (EB)												
5	L2	7	4.0	0.576	9.4	LOS A	5.4	138.5	0.82	0.71	0.92	25.1
2	T1	1096	4.0	0.576	3.7	LOS A	5.6	145.2	0.82	0.62	0.89	24.4
12	R2	120	4.0	0.576	4.2	LOS A	5.6	145.2	0.81	0.54	0.86	23.5
Approach		1223	4.0	0.576	3.8	LOS A	5.6	145.2	0.82	0.61	0.89	24.3
All Vehicles		3627	2.4	0.747	5.6	LOS A	7.5	192.9	0.88	0.86	1.05	24.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AMERICAN STRUCTUREPOINT, INC | Processed: Wednesday, May 27, 2020 11:31:42 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation 052720.sip8

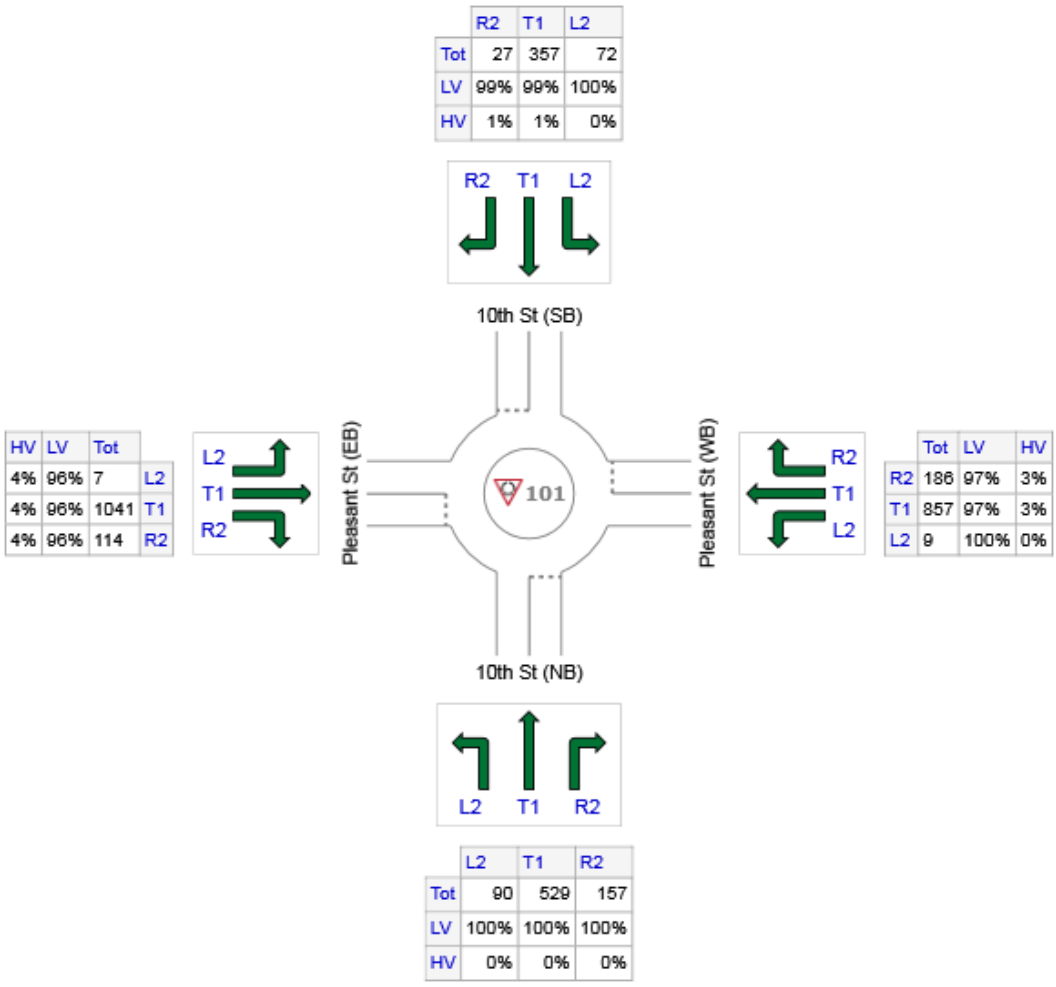
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Pleasant St & 10th St - PM 2045 - 2.0% add NBRTL]

Design Year 2045
PM Peak Hour
Environmental Factor = 1.0
Site Category: (None)
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: 10th St (NB)	776	776	0
E: Pleasant St (WB)	1052	1021	31
N: 10th St (SB)	456	452	4
W: Pleasant St (EB)	1162	1116	46
Total	3446	3364	82

Organisation: AMERICAN STRUCTUREPOINT, INC | Created: Thursday, May 28, 2020 11:37:22 AM
Project: P:\2019\01575\C. Calcs_Data\Traffic\Traffic Study\SIDRA\Pleasant St Roundabout Analysis (final) - lane configuration confirmation

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8365 Keystone Crossing, Suite 201
Indianapolis, IN 46240
Phone: (317) 202-0864 Fax: (317) 202-0908

CORRIDOR STUDY

PLEASANT STREET EXTENSION

PREPARED FOR

OCTOBER 2017
(UPDATED OCTOBER 2018)

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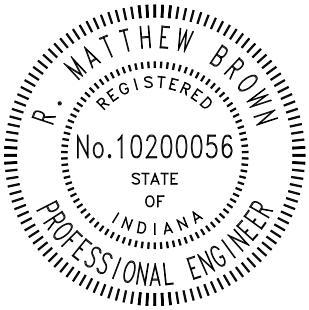
TABLE OF CONTENTS

LIST OF FIGURES

CERTIFICATION

I certify that this **CORRIDOR STUDY** has been prepared by me and under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering.

A&F ENGINEERING CO., LLC



R. Matt Brown, P.E.
Indiana Registration 10200056

Dixian Qiu, E.I
Traffic Engineer

Antoun Fadoul
Traffic Engineer

INTRODUCTION & PURPOSE

This **CORRIDOR STUDY**, prepared at the request of The City of Noblesville, is for the proposed extension of Pleasant Street from 8th Street to Hague Road in Noblesville, Indiana. The purpose of this study is to determine the amount of traffic that will make use of the Pleasant Street corridor between Hague Road and SR 37. Additionally, determine what geometrics and controls are needed along Pleasant Street. This analysis will be completed with the proposed White River Crossing and without the White River Crossing.

SCOPE OF WORK

The scope of work for this analysis is as follows:

First, obtain peak hour turning movement traffic volume counts between the hours of 6:30 AM to 8:30 AM and 3:30 P.M. to 6:30 P.M. during a typical weekday, at the following intersections:

- SR 32 & Hague Road
- SR 32 & Cherry Tree Road
- SR 32 & River Road
- SR 32 & SR 38
- SR 32/SR 38 & Highway 19
- SR 32/SR 38 & 8th Street
- SR 32/SR 38 & 10th Street
- SR 32/SR 38 & 19th Street
- SR 32/SR 38 & Cumberland Road
- SR 32/SR 38 & SR 37
- Pleasant Street & 8th Street
- Pleasant Street & 10th Street
- Pleasant Street & 16th Street
- Pleasant Street & 19th Street
- Pleasant Street & Clover Road
- Pleasant Street & SR 37

Second, collect average daily traffic volumes along SR 32 at the following locations:

- SR 32 west of Hague Road
- SR 32 east of Hague Road
- Hague Road north of SR 32
- SR 32 west of River Road
- SR 32 east of River Road
- SR 32/SR 38 west of White River
- SR 32/SR 38 east of White River
- SR 32/SR 38 west of 8th Street
- SR 32/SR 38 east of 8th Street
- 8th Street north of SR 32/SR 38
- 8th Street south of SR 32/ SR 38
- SR 32/SR 38 west of 14th Street
- SR 32/SR 38 east of 14th Street
- SR 32/SR 38 west of Cumberland Road
- SR 32/SR 38 east of Cumberland Road

Third, collect origin and destination data via Bluetooth devices at several locations throughout the city.

Fourth, construct and calibrate a dynamic traffic model to resemble existing traffic conditions within the study area.

Fifth, calculate future peak hour traffic volumes for the study intersections and roadway segments based on a 10-year horizon period.

Sixth, review the amount of traffic that will divert from the existing SR 32 corridor between Hague Road and SR 37 when the Pleasant Street Extension is completed from Hague Road/SR 32 to SR 37.

Seventh, calculate level of service and queue length analysis at each of the following intersections along Pleasant Street for both roundabout and conventional intersection design:

- Pleasant Street & Hague Road
- Pleasant Street & River Road
- Pleasant Street & 8th Street
- Pleasant Street & 10th Street
- Pleasant Street & 16th Street
- Pleasant Street & 19th Street
- Pleasant Street & Clover Road
- Pleasant Street & SR 37

Finally, prepare a **CORRIDOR STUDY** report documenting all data, analyses, and conclusions and recommendations to best provide for the safe and efficient movement of traffic through the study area.

DESCRIPTION OF THE PROJECT

The project will consist of constructing an extension of Pleasant Street from 8th Street to Hague Road that will include a bridge over White River. Additionally, future improvements could include traffic signals and/or roundabouts at the following intersections:

- Pleasant Street & Hague Road
- Pleasant Street & River Road
- Pleasant Street & 8th Street
- Pleasant Street & 10th Street
- Pleasant Street & 16th Street
- Pleasant Street & 19th Street
- Pleasant Street & Clover Road

EXISTING TRAFFIC DATA & PEAK HOUR

Peak hour turning movement traffic volume counts were collected at each of the study intersections by A&F Engineering Co., LLC. The counts include all "through" traffic and all "turning" traffic at the intersections and were made between the hours of 6:30 AM to 8:30 AM and 4:30 PM to 6:30 PM during a typical weekday in September, 2017, under good weather conditions. Additionally, 24-hour traffic volume counts were gathered during a typical weekday in September 2017 along SR 32, in order to determine the average daily traffic volumes (ADT) and peak hour volumes along a

variety of roadway segments. The AM and PM peak hour volumes are graphically illustrated on **Figure 1,** while the ADT's are shown on **Figure 2**. The count output summary sheets for the study intersections and segments are included in the **Appendix**. In addition, several Bluetooth devices were placed across city to collect origin-destination information to be used for the traffic model.

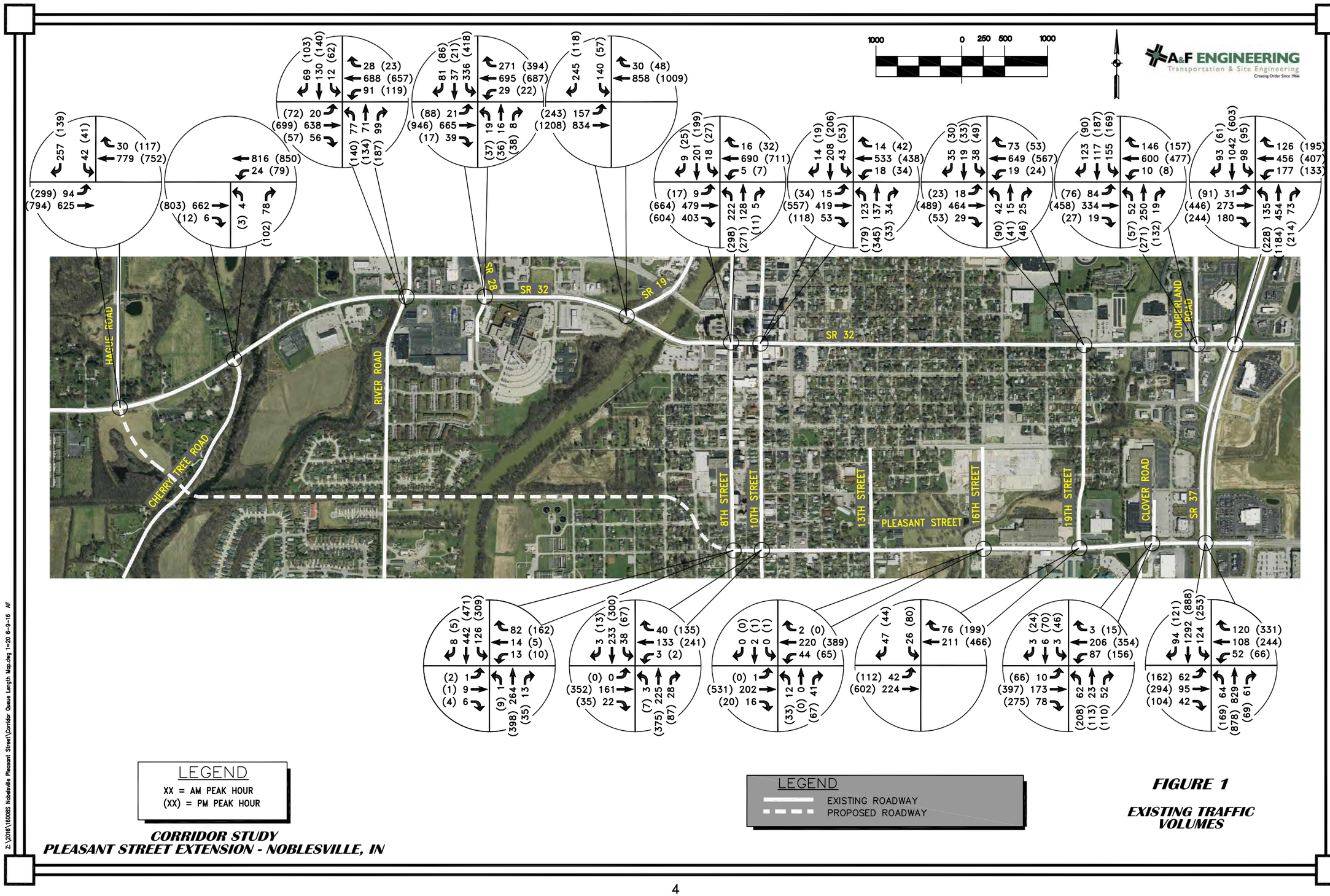
YEAR 2027 TRAFFIC VOLUMES

It is anticipated that several developments will be constructed within the next few years that will have an impact on traffic volumes along Pleasant Street. In order to estimate additional traffic attributed to these developments, historical counts collected along SR 32 and previous growth rates used by INDOT were analyzed. This analysis showed that a 2% per year growth rate would be reasonable over a ten year study period. Therefore, the existing traffic volumes have been increased by a 1.2 growth factor to estimate year 2027 traffic volumes. The year 2027 peak hour turning movement volumes are shown on **Figure 3,** while the future ADT's are shown on **Figure 4**.

YEAR 2027 RE-ASSIGNED TRAFFIC VOLUMES

When the Pleasant Street extension is constructed, it is expected that some of the traffic using SR 32 to cross the White River will utilize the new Pleasant Street extension. *VISUM 16*[1] was used to analyze the amount of traffic diverted to the Pleasant Street extension. *VISUM* utilizes the intersection and roadway segment input data to assign traffic for each Origin-Destination pair onto one or more travel routes within the network. Each of the scenarios was incorporated in the model and a traffic assignment was performed based on collected O-D Bluetooth data and existing traffic volumes to evaluate the impact of the Pleasant Street Extension. The re-assigned volumes are illustrated on **Figure 5**.

[1] *PTV VISUM 16.01-10*, PTV Group, 2016.



CORRIDOR STUDY
PLEASANT STREET EXTENSION - NOBLESVILLE, IN

FIGURE 1

EXISTING TRAFFIC VOLUMES

1000 0 250 500 1000

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NOTE: THESE VOLUMES ARE ROUNDED TO THE NEAREST 10.

LEGEND

XX,XXX = AVERAGE DAILY TRAFFIC

LEGEND

EXISTING ROADWAY

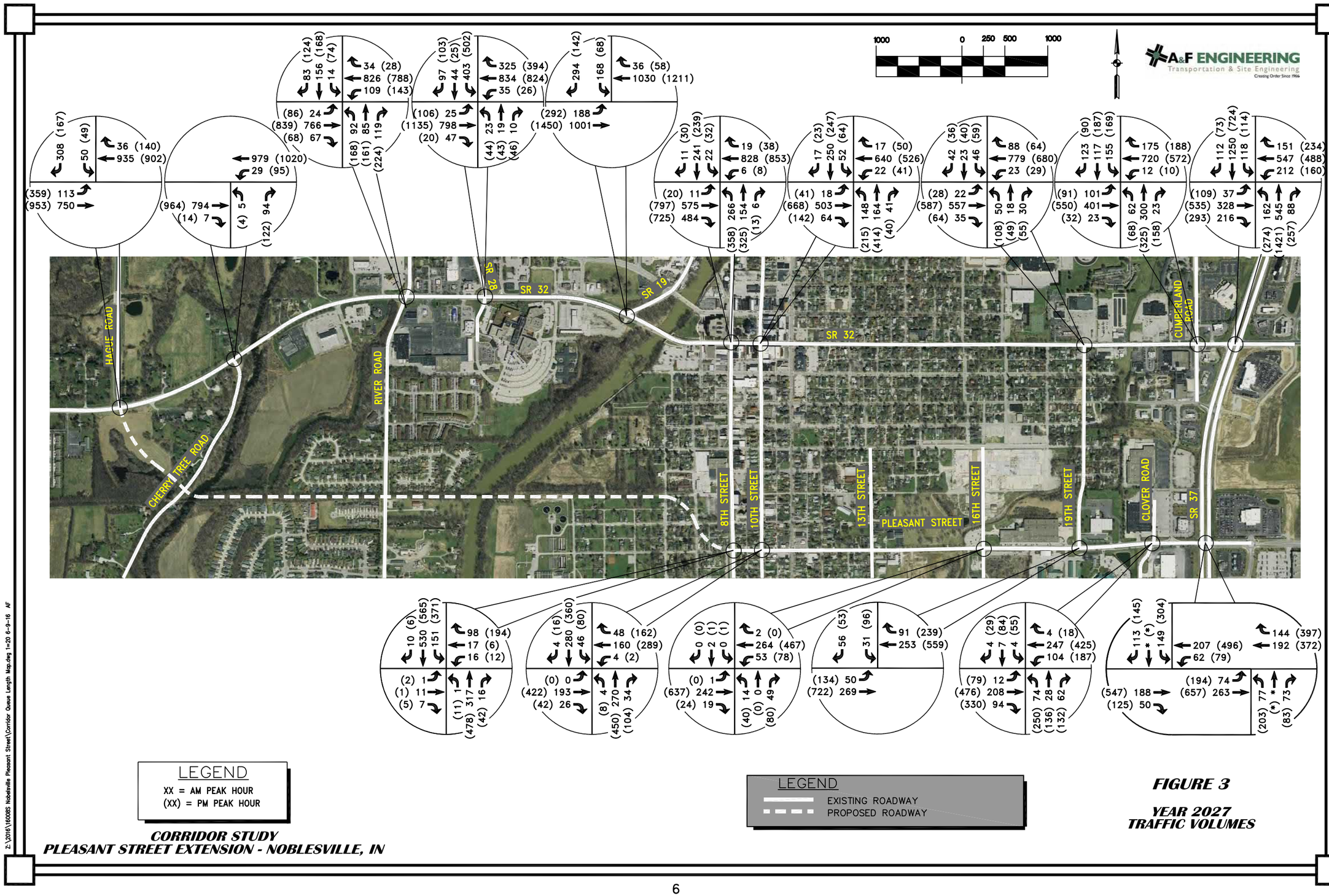
PROPOSED ROADWAY

FIGURE 2

EXISTING AVERAGE DAILY TRAFFIC

CORRIDOR STUDY
PLEASANT STREET EXTENSION - NOBLESVILLE, IN

Z:\2016\160085 Noblesville Pleasant Street\Corridor Queue Length Map.dwg 1=20 6-9-16 AF



CORRIDOR STUDY
PLEASANT STREET EXTENSION - NOBLESVILLE, IN

FIGURE 3

YEAR 2027
TRAFFIC VOLUMES

Z:\2016\16008S Noblesville Pleasant Street\Corridor Queue Length Map.dwg 1=20 6-9-16 AF

1000 0 250 500 1000

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NOTE: THESE VOLUMES ARE ROUNDED TO THE NEAREST 10.

LEGEND

XX,XXX = AVERAGE DAILY TRAFFIC

LEGEND

EXISTING ROADWAY
PROPOSED ROADWAY

FIGURE 4

YEAR 2027 AVERAGE DAILY TRAFFIC

CORRIDOR STUDY
PLEASANT STREET EXTENSION - NOBLESVILLE, IN

Z:\2016\160085 Noblesville Pleasant Street\Corridor Queue Length Map.dwg 1=20 6-9-16 AF

1000 0 250 500 1000

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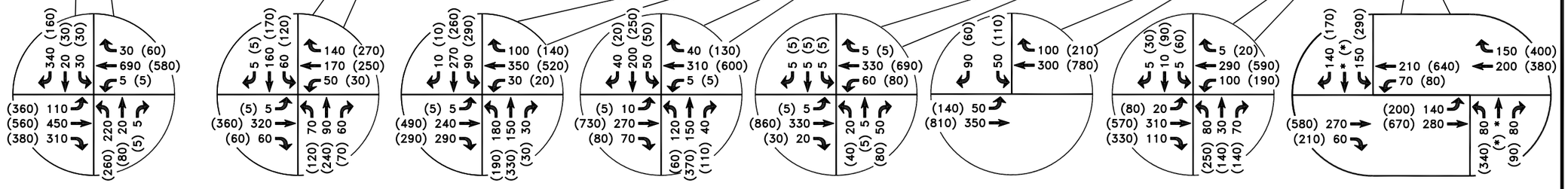
NOTE: THESE VOLUMES ARE ROUNDED TO THE NEAREST 10.



LEGEND
XX = AM PEAK HOUR
(XX) = PM PEAK HOUR

LEGEND
EXISTING ROADWAY
PROPOSED ROADWAY

FIGURE 5

YEAR 2027 RE-ASSIGNED TRAFFIC VOLUMES

CORRIDOR STUDY
PLEASANT STREET EXTENSION - NOBLESVILLE, IN

Z:\2016\160085 Noblesville Pleasant Street\Corridor Queue Length Map.dwg 1=20 6-9-16 AF

CAPACITY ANALYSIS

The "efficiency" of an intersection is based on its ability to accommodate the traffic volumes that approach the intersection. It is defined by the Level-of-Service (LOS) of the intersection. The LOS is determined by a series of calculations commonly called a "capacity analysis". Input data into a capacity analysis include traffic volumes, intersection geometry, number and use of lanes and, in the case of signalized intersections, traffic signal timing. To determine the LOS at each of the study intersections, a capacity analysis has been made using the recognized computer programs *Synchro*[2] and *SIDRA*[3]. *Synchro/SimTraffic* allows multiple intersections to be optimized and analyzed using the capacity calculation methods outlined within the *Highway Capacity Manual (HCM 6th Edition)*[4]. For this study, *Synchro* was used to analyze unsignalized and signalized intersections and *SIDRA* was used to analyze roundabout intersections.

DESCRIPTION OF LEVELS OF SERVICE

The following list shows the delays related to the levels of service for unsignalized, signalized, and roundabout intersections:

Level of Service	Control Delay (seconds/vehicle)	
	UNSIGNALIZED	SIGNALIZED/RAB
A	Less than or equal to 10	Less than or equal to 10
B	Between 10.1 and 15	Between 10.1 and 20
C	Between 15.1 and 25	Between 20.1 and 35
D	Between 25.1 and 35	Between 35.1 and 55
E	Between 35.1 and 50	Between 55.1 and 80
F	greater than 50	greater than 80

It should also be noted that LOS thresholds for signalized intersections were used for roundabouts in order to create an “apples to apples” comparison of each alternative.

[2] *Synchro/SimTraffic 10.0,* Trafficware, 2016.
[3] *SIDRA INTERSECTION 6.1,* Akcelik & Associates Pty Ltd, 2015.
[4] *Highway Capacity Manual (HCM 6th Edition)* Transportation Research Board, National Research Council, Washington, DC, 2016.

ANALYSIS RESULTS & RECOMMENDATIONS

Several conventional and roundabout improvement scenarios were considered for each of the study intersections. The following tables show a summary of the geometrics, LOS, and 95th percentile queue lengths for those scenarios at the study intersections. Based on the LOS and the 95th percentile queue length analysis, recommended geometrics and traffic control options were formulated. These recommendations are highlighted in the tables below along with the LOS and the 95th percentile queue results for each intersection. **Figure 6** illustrates these recommendations graphically, while **Figure 7A** and **Figure 7B** show the 95th percentile queue lengths corresponding to these recommendations.

TABLE 1 – LEVEL OF SERVICE SUMMARY

Intersection	Control Type	Geometrics	AM PEAK					PM PEAK				
			NB	SB	EB	WB	**INT**	NB	SB	EB	WB	**INT**
Pleasant St & SR 37 East Interchange	Roundabout Interchange	NBL, NBT/R; EBL/T, EBT; WBL/T, WBT/R	A	-	A	A	**A**	B	-	A	B	**B**
Pleasant St & SR 37 West Interchange	Roundabout Interchange	SBL, SBT/R; EBL/T, EBT/R; WBL/T, WBT	-	A	A	A	**A**	-	B	A	A	**A**
Pleasant Street & Clover Road	Signal	NBL, NBT/R; SBL, SBT/R; EBL, EBT, EBR; WBL, WBT, WBR	C	C	B	B	**B**	D	D	D	D	**D**
	Roundabout	NBL/T/R; SBL/T/R; EBT/L, EBT/R; WBT/L, WBT/R	A	A	A	A	**A**	C	B	B	B	**B**
Pleasant Street & 19th Street	Two-Way Stop	SBL, SBR; EBL, EBT; WBT, WBR	-	B	A	-	-	-	F	B	-	-
	Signal	SBL, SBR; EBL, EBT; WBT, WBR	-	B	A	A	**A**	-	C	A	B	**B**
	Roundabout	SBL/R; EBT/L, EBT; WBT, WBT/R	-	A	A	A	**A**	-	A	A	A	**A**
	Roundabout	SBL/R; EBL/T; WBT/R	-	A	A	A	**A**	-	B	E	C	**D**

Intersection	Control Type	Geometrics	AM PEAK					PM PEAK				
			NB	SB	EB	WB	**INT**	NB	SB	EB	WB	**INT**
Pleasant Street & 16th Street	Two-Way Stop	NBL/T/R; SBL/T/R; EBL, EBT/R; WBL, WBT/R	B	B	A	A	-	F	E	A	B	-
	Signal	NBL/T/R; SBL/T/R; EBL, EBT/R; WBL, WBT/R	A	A	A	A	**A**	C	C	A	A	**A**
	Roundabout	NBL/T/R; SBL/T/R; EBL/T/R; WBL/T/R	A	A	A	A	**A**	B	A	D	B	**C**
Pleasant Street & 10th Street	Signal	NBL, NBT/R; SBL, SBT/R; EBL, EBT/R; WBL, WBT/R	A	A	A	A	**A**	C	B	C	C	**C**
	Roundabout	NBL, NBT/R; SBL, SBT/R; EBL/T, EBT/R; WBL/T, WBT/R	A	A	A	A	**A**	C	A	A	A	**B**
Pleasant Street & 8th Street	Signal	NBL, NBT/R; SBL, SBT/R; EBL, EBT/R; WBL, WBT/R	B	C	C	B	**B**	D	D	E	C	**D**
	Roundabout	NBL, NBT/R; SBL, SBT/R; EBL/T, EBT/R; WBL/T, WBT/R	A	A	A	A	**A**	B	B	B	B	**B**
Pleasant Street & River Road	Signal	NBL, NBT/R; SBL, SBT/R; EBL, EBT/R; WBL, WBT/R	B	B	B	B	**B**	C	B	B	C	**C**
	Roundabout	NBL/T/R; SBL/T/R; EBL/T/R; WBL/T/R	A	A	A	A	**A**	B	A	A	B	**B**
SR 32 & Pleasant Street/ Hague Road	Signal	NBL, NBT/R; SBL, SBT/R; EBL, EBT, EBR; WBL, WBT, WBR	D	B	B	C	**C**	D	C	D	B	**C**
	Roundabout	NBL/T, NBT/R; SBL/T, SBT/R; EBL/T, EBT/R; WBL/T, WBT/R	A	B	A	A	**A**	B	A	A	B	**B**

TABLE 2 – 95TH PERCENTILE QUEUE LENGTH SUMMARY

Intersection	Control Type	Geometrics	AM PEAK				PM PEAK			
			NB	SB	EB	WB	NB	SB	EB	WB
Pleasant Street & SR 37 East Interchange	Roundabout Interchange	NBL, NBT/R; EBL/T, EBT; WBL/T, WBT/R	10'	-	-	20'	100'	-	-	80'
Pleasant Street & SR 37 West Interchange	Roundabout Interchange	SBL, SBT/R; EBL/T, EBT/R; WBL/T, WBT	-	20'	20'	-	-	60'	60'	-
Pleasant Street & Clover Road	Signal	NBL, NBT/R; SBL, SBT/R; EBL, EBT, EBR; WBL, WBT, WBR	80'	20'	200'	160'	330'	110'	590'	550'
	Roundabout	NBL/T/R; SBL/T/R; EBT/L, EBT/R; WBT/L, WBT/R	20'	0'	20'	20'	190'	40'	90'	80'
Pleasant Street & 19th Street	Two-Way Stop	SBL, SBR; EBL, EBT; WBT, WBR	-	10'	0'	0'	-	110'	30'	0'
	Signal	SBL, SBR; EBL, EBT; WBT, WBR	-	40'	80'	120'	-	90'	340'	540'
	Roundabout	SBL/R; EBT/L, EBT; WBT, WBT/R	-	10'	20'	20'	-	30'	60'	80'
	Roundabout	SBL/R; EBL/T; WBT/R	-	20'	50'	50'	-	40'	1560'	460'
Pleasant Street & 16th Street	Two-Way Stop	NBL/T/R; SBL/T/R; EBL, EBT/R; WBL, WBT/R	20'	0'	0'	0'	90'	10'	0'	10'
	Signal	NBL/T/R; SBL/T/R; EBL, EBT/R; WBL, WBT/R	30’	10’	80’	80'	60’	20'	410’	250’
	Roundabout	NBL/T/R; SBL/T/R; EBL/T/R; WBL/T/R	10'	0'	50'	50'	30'	0'	320'	160'
Pleasant Street & 10th Street	Signal	NBL, NBT/R; SBL, SBT/R; EBL, EBT/R; WBL, WBT/R	70'	100'	120'	130'	330'	140'	530'	450'
	Roundabout	NBL, NBT/R; SBL, SBT/R; EBL/T, EBT/R; WBL/T, WBT/R	20'	30'	20'	20'	170'	40'	80'	60'
Pleasant Street & 8th Street	Signal	NBL, NBT/R; SBL, SBT/R; EBL, EBT/R; WBL, WBT/R	130'	220'	320'	280'	420'	330'	800'	610'
	Roundabout	NBL, NBT/R; SBL, SBT/R; EBL/T, EBT/R; WBL/T, WBT/R	20'	40'	40'	40'	90'	60'	80'	80'
Pleasant Street & River Road	Signal	NBL, NBT/R; SBL, SBT/R; EBL, EBT/R; WBL, WBT/R	100'	130'	240'	170'	260'	150'	310'	420'
	Roundabout	NBL/T/R; SBL/T/R; EBL/T/R; WBL/T/R	30'	30'	60'	50'	110'	50'	80'	150'
SR 32 & Pleasant Street/ Hague Road	Signal	NBL, NBT/R; SBL, SBT/R; EBL, EBT, EBR; WBL, WBT, WBR	200'	150'	200'	430'	250'	80'	390'	540'
	Roundabout	NBL/T, NBT/R; SBL/T, SBT/R; EBL/T, EBT/R; WBL/T, WBT/R	30'	110'	60'	50'	70'	30'	110'	80'

* Note: The queues are rounded to the nearest 10.

1000 0 250 500 1000

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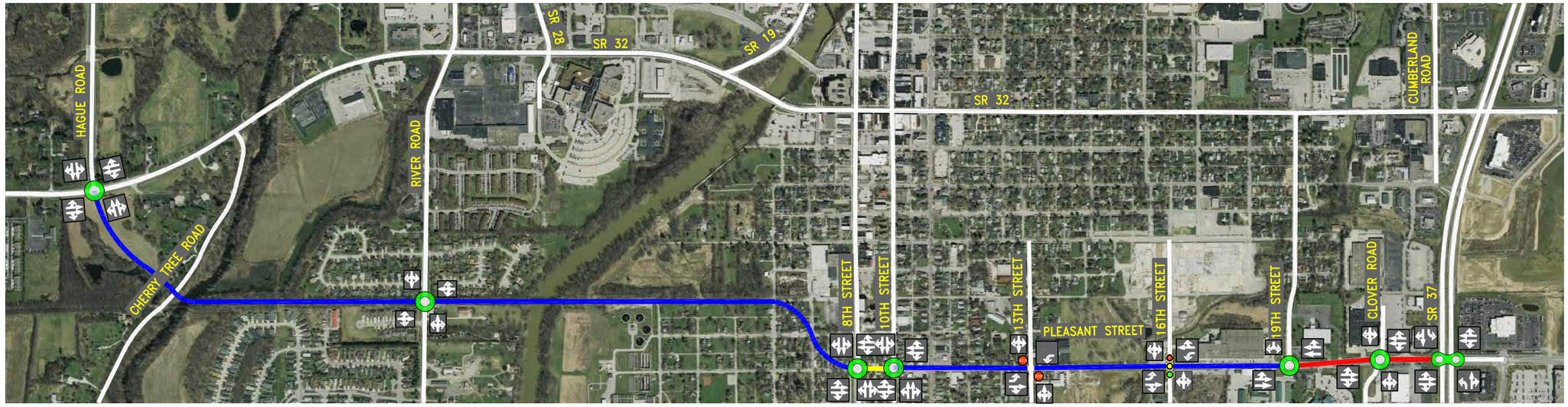

LEGEND

- 4–Lane Section with Optional Median/TWLTL
- 2–Lane Section with Optional Median/TWLTL
- 4–Lane Section with Median
- Traffic Signal
- Single or Multi–Lane Roundabout

FIGURE 6

RECOMMENDED INTERSECTION GEOMETRICS & CONTROL

CORRIDOR STUDY
PLEASANT STREET EXTENSION - NOBLESVILLE, IN

Z:\2016\16008S Noblesville Pleasant Street\Corridor Queue Length Map.dwg 1=20 6-9-16 AF

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LEGEND
- EXISTING ROADWAY
- PROPOSED ROADWAY
- 95TH PERCENTILE QUEUE LENGTH
- (X) INTERSECTION LEVEL OF SERVICE

FIGURE 7A

LOS & 95TH PERCENTILE QUEUE LENGTHS (AM PEAK)

CORRIDOR STUDY
PLEASANT STREET EXTENSION - NOBLESVILLE, IN

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LEGEND
- EXISTING ROADWAY
- PROPOSED ROADWAY
- 95TH PERCENTILE QUEUE LENGTH
- (X) INTERSECTION LEVEL OF SERVICE

FIGURE 7B

LOS & 95TH PERCENTILE QUEUE LENGTHS (PM PEAK)

CORRIDOR STUDY
PLEASANT STREET EXTENSION - NOBLESVILLE, IN

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CORRIDOR STUDY

APPENDIX

A&F ENGINEERING
Transportation & Site Engineering
Creating Order Since 1966

8365 Keystone Crossing Boulevard, Suite 201
Indianapolis, IN 46240
Phone: (317) 202-0864 Fax: (317) 202-0908

SR 32 & SR 37

TRAFFIC VOLUME COUNTS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT :	City of Noblesville
INTERSECTION :	SR 32/SR 38 & SR 37
DATE :	8/30/2017
COUNTED BY :	Miovisions

TOTAL VEHICLES (PASSENGER CARS + TRUCKS)

	AM PEAK HOUR VOLUMES BEGINS 7:00 AM				OFF PEAK HOUR VOLUMES BEGINS 2:00 PM				PM PEAK HOUR VOLUMES BEGINS 4:45 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	135	454	73	**662**	200	670	146	**1016**	228	1184	214	**1626**
SOUTHBOUND	98	1042	93	**1233**	71	496	34	**601**	95	603	61	**759**
EASTBOUND	31	273	180	**484**	72	338	295	**705**	91	446	244	**781**
WESTBOUND	177	456	126	**759**	164	295	94	**553**	133	407	195	**735**

PEAK HOUR FACTOR

	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.92	0.95	0.89	0.93	0.93	0.95
SOUTHBOUND	0.90		0.92		0.93	
EASTBOUND	0.89		0.96		0.90	
WESTBOUND	0.90		0.89		0.92	

TRUCK PERCENTAGE

	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	3.0%	6.6%	6.8%	5.9%	5.0%	5.2%	7.5%	5.5%	0.9%	0.7%	2.3%	0.9%
SOUTHBOUND	6.1%	2.8%	6.5%	3.3%	5.6%	6.0%	0.0%	5.7%	1.1%	3.0%	3.3%	2.8%
EASTBOUND	9.7%	5.5%	9.4%	7.2%	0.0%	7.1%	4.7%	5.4%	0.0%	3.4%	3.7%	3.1%
WESTBOUND	6.2%	5.5%	2.4%	5.1%	6.7%	9.8%	3.2%	7.8%	1.5%	1.0%	1.5%	1.2%

HOURLY SUMMARY

HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
12:00 AM	TO	1:00 AM	52	28	80	30	25	55	135
1:00 AM	TO	2:00 AM	44	26	70	33	35	68	138
2:00 AM	TO	3:00 AM	38	31	69	30	12	42	111
3:00 AM	TO	4:00 AM	32	57	89	28	19	47	136
4:00 AM	TO	5:00 AM	55	151	206	34	53	87	293
5:00 AM	TO	6:00 AM	128	452	580	123	163	286	866
6:00 AM	TO	7:00 AM	356	991	1347	349	458	807	2154
7:00 AM	TO	8:00 AM	662	1233	1895	484	759	1243	3138
8:00 AM	TO	9:00 AM	623	986	1609	485	658	1143	2752
9:00 AM	TO	10:00 AM	656	741	1397	562	489	1051	2448
10:00 AM	TO	11:00 AM	667	591	1258	597	445	1042	2300
11:00 AM	TO	12:00 PM	755	676	1431	682	490	1172	2603
12:00 PM	TO	1:00 PM	889	663	1552	740	540	1280	2832
1:00 PM	TO	2:00 PM	895	598	1493	663	561	1224	2717
2:00 PM	TO	3:00 PM	1016	601	1617	705	553	1258	2875
3:00 PM	TO	4:00 PM	1147	733	1880	747	521	1268	3148
4:00 PM	TO	5:00 PM	1447	745	2192	764	686	1450	3642
5:00 PM	TO	6:00 PM	1596	774	2370	788	704	1492	3862
6:00 PM	TO	7:00 PM	1233	736	1969	732	468	1200	3169
7:00 PM	TO	8:00 PM	878	634	1512	633	322	955	2467
8:00 PM	TO	9:00 PM	695	498	1193	466	296	762	1955
9:00 PM	TO	10:00 PM	499	265	764	276	182	458	1222
10:00 PM	TO	11:00 PM	294	131	425	153	117	270	695
11:00 PM	TO	12:00 AM	124	71	195	80		132	327
TOTAL VOLUME			14781	12412	27193	10184	8608	18792	45985
PERCENTAGE			32.1%	27.0%	59.1%	22.1%	18.7%	40.9%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : SR 32/SR 38 & SR 37
DATE : 8/30/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
12:00 AM - 1:00 AM	7	0	7	33	1	34	10	1	11	50	2	52
1:00 AM - 2:00 AM	4	3	7	24	1	25	10	2	12	38	6	44
2:00 AM - 3:00 AM	4	0	4	18	2	20	12	2	14	34	4	38
3:00 AM - 4:00 AM	6	3	9	18	0	18	5	0	5	29	3	32
4:00 AM - 5:00 AM	5	2	7	28	8	36	12	0	12	45	10	55
5:00 AM - 6:00 AM	29	1	30	73	8	81	16	1	17	118	10	128
6:00 AM - 7:00 AM	69	5	74	220	26	246	32	4	36	321	35	356
7:00 AM - 8:00 AM	131	4	135	424	30	454	68	5	73	623	39	662
8:00 AM - 9:00 AM	167	14	181	315	45	360	75	7	82	557	66	623
9:00 AM - 10:00 AM	169	10	179	342	33	375	92	10	102	603	53	656
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	167	16	183	338	38	376	102	6	108	607	60	667
11:00 AM - 12:00 PM	197	9	206	387	32	419	118	12	130	702	53	755
12:00 PM - 1:00 PM	224	6	230	506	27	533	119	7	126	849	40	889
1:00 PM - 2:00 PM	240	8	248	491	27	518	122	7	129	853	42	895
2:00 PM - 3:00 PM	190	10	200	635	35	670	135	11	146	960	56	1016
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	205	5	210	741	26	767	163	7	170	1109	38	1147
4:00 PM - 5:00 PM	198	3	201	997	15	1012	230	4	234	1425	22	1447
5:00 PM - 6:00 PM	244	2	246	1152	11	1163	181	6	187	1577	19	1596
6:00 PM - 7:00 PM	197	1	198	880	12	892	140	3	143	1217	16	1233
7:00 PM - 8:00 PM	152	4	156	613	3	616	104	2	106	869	9	878
8:00 PM - 9:00 PM	103	2	105	503	5	508	82	0	82	688	7	695
9:00 PM - 10:00 PM	82	1	83	353	4	357	59	0	59	494	5	499
10:00 PM - 11:00 PM	32	0	32	208	3	211	50	1	51	290	4	294
11:00 PM - 12:00 AM	16	0	16	83	3	86	22	0	22	121	3	124
PASSENGER	2838			9382			1959			14179		
	96.3%			96.0%			95.2%			95.9%		
TRUCK	109			395			98			602		
	3.7%			4.0%			4.8%			4.1%		
BOTH	2947			9777			2057			14781		
	19.9%			66.1%			13.9%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
12:00 AM - 1:00 AM	1	0	1	24	1	25	2	0	2	27	1	28
1:00 AM - 2:00 AM	3	1	4	18	2	20	0	2	2	21	5	26
2:00 AM - 3:00 AM	2	0	2	24	4	28	1	0	1	27	4	31
3:00 AM - 4:00 AM	5	0	5	43	4	47	5	0	5	53	4	57
4:00 AM - 5:00 AM	13	0	13	125	6	131	7	0	7	145	6	151
5:00 AM - 6:00 AM	13	0	13	401	15	416	23	0	23	437	15	452
6:00 AM - 7:00 AM	36	3	39	866	21	887	64	1	65	966	25	991
7:00 AM - 8:00 AM	92	6	98	1013	29	1042	87	6	93	1192	41	1233
8:00 AM - 9:00 AM	76	4	80	795	26	821	82	3	85	953	33	986
9:00 AM - 10:00 AM	59	6	65	572	32	604	69	3	72	700	41	741
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	50	5	55	461	21	482	51	3	54	562	29	591
11:00 AM - 12:00 PM	61	3	64	510	33	543	62	7	69	633	43	676
12:00 PM - 1:00 PM	74	5	79	507	25	532	47	5	52	628	35	663
1:00 PM - 2:00 PM	58	5	63	448	36	484	48	3	51	554	44	598
2:00 PM - 3:00 PM	67	4	71	466	30	496	34	0	34	567	34	601
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	91	7	98	546	37	583	51	1	52	688	45	733
4:00 PM - 5:00 PM	106	1	107	555	25	580	56	2	58	717	28	745
5:00 PM - 6:00 PM	88	1	89	608	14	622	62	1	63	758	16	774
6:00 PM - 7:00 PM	89	1	90	580	14	594	52	0	52	721	15	736
7:00 PM - 8:00 PM	75	0	75	521	11	532	26	1	27	622	12	634
8:00 PM - 9:00 PM	66	3	69	397	10	407	21	1	22	484	14	498
9:00 PM - 10:00 PM	26	1	27	203	4	207	31	0	31	260	5	265
10:00 PM - 11:00 PM	14	0	14	97	3	100	16	1	17	127	4	131
11:00 PM - 12:00 AM	6	0	6	59	2	61	4	0	4	69	2	71
PASSENGER	1171			9839			901			11911		
	95.4%			96.0%			95.7%			96.0%		
TRUCK	56			405			40			501		
	4.6%			4.0%			4.3%			4.0%		
BOTH	1227			10244			941			12412		
	9.9%			82.5%			7.6%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
12:00 AM - 1:00 AM	3	0	3	16	2	18	9	0	9	28	2	30
1:00 AM - 2:00 AM	3	0	3	16	4	20	9	1	10	28	5	33
2:00 AM - 3:00 AM	3	1	4	10	2	12	11	3	14	24	6	30
3:00 AM - 4:00 AM	1	1	2	13	1	14	11	1	12	25	3	28
4:00 AM - 5:00 AM	1	2	3	14	2	16	13	2	15	28	6	34
5:00 AM - 6:00 AM	10	0	10	40	3	43	68	2	70	118	5	123
6:00 AM - 7:00 AM	19	1	20	168	7	175	145	9	154	332	17	349
7:00 AM - 8:00 AM	28	3	31	258	15	273	163	17	180	449	35	484
8:00 AM - 9:00 AM	29	0	29	219	38	257	184	15	199	432	53	485
9:00 AM - 10:00 AM	45	2	47	233	25	258	236	21	257	514	48	562
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	57	8	65	247	28	275	244	13	257	548	49	597
11:00 AM - 12:00 PM	76	8	84	268	26	294	291	13	304	635	47	682
12:00 PM - 1:00 PM	71	5	76	296	36	332	311	21	332	678	62	740
1:00 PM - 2:00 PM	64	3	67	260	29	289	297	10	307	621	42	663
2:00 PM - 3:00 PM	72	0	72	314	24	338	281	14	295	667	38	705
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	100	3	103	355	25	380	254	10	264	709	38	747
4:00 PM - 5:00 PM	74	0	74	422	14	436	243	11	254	739	25	764
5:00 PM - 6:00 PM	95	1	96	418	16	434	249	9	258	762	26	788
6:00 PM - 7:00 PM	109	0	109	363	9	372	246	5	251	718	14	732
7:00 PM - 8:00 PM	71	2	73	307	4	311	247	2	249	625	8	633
8:00 PM - 9:00 PM	61	0	61	181	2	183	221	1	222	463	3	466
9:00 PM - 10:00 PM	41	0	41	130	6	136	96	3	99	267	9	276
10:00 PM - 11:00 PM	10	3	13	79	5	84	53	3	56	142	11	153
11:00 PM - 12:00 AM	7	1	8	40	1	41	31	0	31	78	2	80
PASSENGER	1050			4667			3913			9630		
	96.0%			93.5%			95.5%			94.6%		
TRUCK	44			324			186			554		
	4.0%			6.5%			4.5%			5.4%		
BOTH	1094			4991			4099			10184		
	10.7%			49.0%			40.2%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
12:00 AM - 1:00 AM	9	0	9	11	2	13	3	0	3	23	2	25
1:00 AM - 2:00 AM	10	1	11	19	1	20	4	0	4	33	2	35
2:00 AM - 3:00 AM	5	1	6	3	0	3	3	0	3	11	1	12
3:00 AM - 4:00 AM	6	1	7	7	2	9	3	0	3	16	3	19
4:00 AM - 5:00 AM	12	1	13	37	1	38	2	0	2	51	2	53
5:00 AM - 6:00 AM	41	2	43	104	6	110	10	0	10	155	8	163
6:00 AM - 7:00 AM	99	5	104	289	10	299	52	3	55	440	18	458
7:00 AM - 8:00 AM	166	11	177	431	25	456	123	3	126	720	39	759
8:00 AM - 9:00 AM	163	11	174	391	29	420	52	12	64	606	52	658
9:00 AM - 10:00 AM	111	10	121	280	22	302	61	5	66	452	37	489
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	146	5	151	201	35	236	55	3	58	402	43	445
11:00 AM - 12:00 PM	162	13	175	228	25	253	58	4	62	448	42	490
12:00 PM - 1:00 PM	164	6	170	267	30	297	69	4	73	500	40	540
1:00 PM - 2:00 PM	158	5	163	283	27	310	84	4	88	525	36	561
2:00 PM - 3:00 PM	153	11	164	266	29	295	91	3	94	510	43	553
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	125	6	131	260	15	275	105	10	115	490	31	521
4:00 PM - 5:00 PM	140	5	145	349	12	361	171	9	180	660	26	686
5:00 PM - 6:00 PM	131	1	132	390	3	393	175	4	179	696	8	704
6:00 PM - 7:00 PM	102	1	103	249	5	254	109	2	111	460	8	468
7:00 PM - 8:00 PM	92	1	93	149	4	153	76	0	76	317	5	322
8:00 PM - 9:00 PM	65	0	65	151	6	157	74	0	74	290	6	296
9:00 PM - 10:00 PM	46	0	46	85	5	90	46	0	46	177	5	182
10:00 PM - 11:00 PM	32	0	32	57	0	57	28	0	28	117	0	117
11:00 PM - 12:00 AM	9	0	9	30	0	30	13	0	13	52	0	52
PASSENGER	2147			4537			1467			8151		
	95.7%			93.9%			95.7%			94.7%		
TRUCK	97			294			66			457		
	4.3%			6.1%			4.3%			5.3%		
BOTH	2244			4831			1533			8608		
	26.1%			56.1%			17.8%			100.0%		

Release 11-18-04

SR 32 & CUMBERLAND ROAD

TRAFFIC VOLUME COUNTS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : SR32/38 & Cumberland Road
DATE : 9/21/2017
COUNTED BY : Miovision

TOTAL VEHICLES (PASSENGER CARS + TRUCKS)

	AM PEAK HOUR VOLUMES BEGINS 7:00 AM				OFF PEAK HOUR VOLUMES BEGINS 12:45 PM				PM PEAK HOUR VOLUMES BEGINS 5:00 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	52	250	19	**321**	59	211	71	**341**	57	271	132	**460**
SOUTHBOUND	155	117	123	**395**	179	186	99	**464**	169	187	90	**446**
EASTBOUND	84	334	19	**437**	79	524	66	**669**	76	458	27	**561**
WESTBOUND	10	600	146	**756**	24	523	109	**656**	8	477	157	**642**

PEAK HOUR FACTOR

	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.70	0.81	0.86	0.85	0.84	0.98
SOUTHBOUND	0.80		0.60		0.83	
EASTBOUND	0.87		0.86		0.86	
WESTBOUND	0.84		0.96		0.94	

TRUCK PERCENTAGE

	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	1.9%	4.0%	10.5%	4.0%	1.7%	3.3%	4.2%	3.2%	0.0%	0.7%	0.8%	0.7%
SOUTHBOUND	6.5%	1.7%	0.0%	3.0%	1.7%	0.5%	2.0%	1.3%	0.0%	0.5%	0.0%	0.2%
EASTBOUND	0.0%	8.7%	0.0%	6.6%	2.5%	9.2%	1.5%	7.6%	0.0%	3.7%	0.0%	3.0%
WESTBOUND	10.0%	7.2%	5.5%	6.9%	4.2%	8.0%	1.8%	6.9%	0.0%	2.3%	0.0%	1.7%

HOURLY SUMMARY

HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	86	184	270	261	421	682	952
7:00 AM	TO	8:00 AM	321	395	716	437	756	1193	1909
8:00 AM	TO	9:00 AM	188	319	507	474	592	1066	1573
10:00 AM	TO	11:00 AM	218	356	574	581	606	1187	1761
11:00 AM	TO	12:00 PM	240	328	568	653	530	1183	1751
12:00 PM	TO	1:00 PM	354	356	710	655	593	1248	1958
1:00 PM	TO	2:00 PM	330	463	793	675	637	1312	2105
2:00 PM	TO	3:00 PM	306	486	792	658	545	1203	1995
3:00 PM	TO	4:00 PM	318	409	727	608	528	1136	1863
4:00 PM	TO	5:00 PM	429	490	919	551	603	1154	2073
5:00 PM	TO	6:00 PM	460	446	906	561	642	1203	2109
6:00 PM	TO	7:00 PM	289	345	634	615	536	1151	1785
TOTAL VOLUME			3539	4577	8116	6729	6989	13718	21834
PERCENTAGE			16.2%	21.0%	37.2%	30.8%	32.0%	62.8%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : SR32/38 & Cumberland Road
DATE : 9/21/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	25	0	25	56	1	57	4	0	4	85	1	86
7:00 AM - 8:00 AM	51	1	52	240	10	250	17	2	19	308	13	321
8:00 AM - 9:00 AM	43	3	46	108	21	129	13	0	13	164	24	188
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	60	1	61	123	1	124	32	1	33	215	3	218
11:00 AM - 12:00 PM	58	0	58	130	4	134	46	2	48	234	6	240
12:00 PM - 1:00 PM	74	3	77	198	6	204	69	4	73	341	13	354
1:00 PM - 2:00 PM	59	1	60	186	6	192	76	2	78	321	9	330
2:00 PM - 3:00 PM	63	0	63	173	6	179	64	0	64	300	6	306
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	57	5	62	158	15	173	80	3	83	295	23	318
4:00 PM - 5:00 PM	66	0	66	229	4	233	130	0	130	425	4	429
5:00 PM - 6:00 PM	57	0	57	269	2	271	131	1	132	457	3	460
6:00 PM - 7:00 PM	55	0	55	173	0	173	60	1	61	288	1	289
PASSENGER	668			2043			722			3433		
	97.9%			96.4%			97.8%			97.0%		
TRUCK	14			76			16			106		
	2.1%			3.6%			2.2%			3.0%		
BOTH	682			2119			738			3539		
	19.3%			59.9%			20.9%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	95	14	109	37	1	38	37	0	37	169	15	184
7:00 AM - 8:00 AM	145	10	155	115	2	117	123	0	123	383	12	395
8:00 AM - 9:00 AM	124	4	128	119	2	121	69	1	70	312	7	319
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	139	4	143	121	2	123	89	1	90	349	7	356
11:00 AM - 12:00 PM	130	5	135	115	0	115	77	1	78	322	6	328
12:00 PM - 1:00 PM	132	2	134	140	1	141	79	2	81	351	5	356
1:00 PM - 2:00 PM	169	5	174	194	1	195	93	1	94	456	7	463
2:00 PM - 3:00 PM	168	4	172	195	4	199	115	0	115	478	8	486
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	149	3	152	155	1	156	101	0	101	405	4	409
4:00 PM - 5:00 PM	191	2	193	198	0	198	99	0	99	488	2	490
5:00 PM - 6:00 PM	169	0	169	186	1	187	90	0	90	445	1	446
6:00 PM - 7:00 PM	122	0	122	148	0	148	75	0	75	345	0	345
PASSENGER	1733			1723			1047			4503		
	97.0%			99.1%			99.4%			98.4%		
TRUCK	53			15			6			74		
	3.0%			0.9%			0.6%			1.6%		
BOTH	1786			1738			1053			4577		
	39.0%			38.0%			23.0%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	19	0	19	214	15	229	13	0	13	246	15	261
7:00 AM - 8:00 AM	84	0	84	305	29	334	19	0	19	408	29	437
8:00 AM - 9:00 AM	66	2	68	335	36	371	33	2	35	434	40	474
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	72	0	72	417	41	458	51	0	51	540	41	581
11:00 AM - 12:00 PM	60	3	63	491	40	531	58	1	59	609	44	653
12:00 PM - 1:00 PM	82	1	83	475	37	512	60	0	60	617	38	655
1:00 PM - 2:00 PM	81	1	82	485	43	528	63	2	65	629	46	675
2:00 PM - 3:00 PM	91	0	91	469	57	526	41	0	41	601	57	658
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	65	3	68	471	31	502	37	1	38	573	35	608
4:00 PM - 5:00 PM	67	0	67	426	32	458	26	0	26	519	32	551
5:00 PM - 6:00 PM	76	0	76	441	17	458	27	0	27	544	17	561
6:00 PM - 7:00 PM	86	1	87	473	14	487	41	0	41	600	15	615
PASSENGER	849			5002			469			6320		
	98.7%			92.7%			98.7%			93.9%		
TRUCK	11			392			6			409		
	1.3%			7.3%			1.3%			6.1%		
BOTH	860			5394			475			6729		
	12.8%			80.2%			7.1%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	1	0	1	360	11	371	48	1	49	409	12	421
7:00 AM - 8:00 AM	9	1	10	557	43	600	138	8	146	704	52	756
8:00 AM - 9:00 AM	9	0	9	476	34	510	68	5	73	553	39	592
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	16	0	16	475	31	506	81	3	84	572	34	606
11:00 AM - 12:00 PM	27	1	28	404	32	436	63	3	66	494	36	530
12:00 PM - 1:00 PM	21	0	21	432	41	473	98	1	99	551	42	593
1:00 PM - 2:00 PM	19	1	20	482	36	518	97	2	99	598	39	637
2:00 PM - 3:00 PM	19	0	19	399	23	422	103	1	104	521	24	545
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	15	0	15	394	31	425	81	7	88	490	38	528
4:00 PM - 5:00 PM	23	0	23	423	23	446	134	0	134	580	23	603
5:00 PM - 6:00 PM	8	0	8	466	11	477	157	0	157	631	11	642
6:00 PM - 7:00 PM	7	0	7	390	4	394	135	0	135	532	4	536
PASSENGER	174			5258			1203			6635		
	98.3%			94.3%			97.5%			94.9%		
TRUCK	3			320			31			354		
	1.7%			5.7%			2.5%			5.1%		
BOTH	177			5578			1234			6989		
	2.5%			79.8%			17.7%			100.0%		

Release 11-18-04

SR 32 & 19TH STREET

TRAFFIC VOLUME COUNTS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT :	City of Noblesville SR
INTERSECTION :	32/38 & 19th Street
DATE :	9/12/2017
COUNTED BY :	Miovision

	TOTAL VEHICLES (PASSENGER CARS + TRUCKS)											
	AM PEAK HOUR VOLUMES BEGINS 7:15 AM				OFF PEAK HOUR VOLUMES BEGINS				PM PEAK HOUR VOLUMES BEGINS 5:00 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	42	15	25	**82**					90	41	46	**177**
SOUTHBOUND	38	19	35	**92**					49	33	30	**112**
EASTBOUND	18	464	29	**511**					23	489	53	**565**
WESTBOUND	19	649	73	**741**					24	567	53	**644**

	PEAK HOUR FACTOR					
	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.71	0.92			0.96	0.97
SOUTHBOUND	0.88				0.80	
EASTBOUND	0.95				0.94	
WESTBOUND	0.89				0.93	

	TRUCK PERCENTAGE											
	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	0.0%	0.0%	0.0%	0.0%					0.0%	0.0%	0.0%	0.0%
SOUTHBOUND	5.3%	5.3%	0.0%	3.3%					0.0%	0.0%	0.0%	0.0%
EASTBOUND	0.0%	8.4%	3.4%	7.8%					0.0%	3.7%	1.9%	3.4%
WESTBOUND	0.0%	5.5%	1.4%	5.0%					0.0%	2.6%	0.0%	2.3%

HOURLY SUMMARY								
HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	26	27	53	139	311	450	503
7:00 AM	TO	8:00 AM	84	82	166	504	728	1232	1398
8:00 AM	TO	9:00 AM	34	42	76	221	315	536	612
4:00 PM	TO	5:00 PM	101	47	148	284	284	568	716
5:00 PM	TO	6:00 PM	177	112	289	565	644	1209	1498
6:00 PM	TO	7:00 PM	68	61	129	298	275	573	702
TOTAL VOLUME			490	371	861	2011	2557	4568	5429
PERCENTAGE			9.0%	6.8%	15.9%	37.0%	47.1%	84.1%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : SR 32_38 & 19th Street
DATE : 9/12/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	11	0	11	6	0	6	9	0	9	26	0	26
7:00 AM - 8:00 AM	44	0	44	16	0	16	24	0	24	84	0	84
8:00 AM - 9:00 AM	15	1	16	6	0	6	12	0	12	33	1	34
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	51	0	51	20	0	20	30	0	30	101	0	101
5:00 PM - 6:00 PM	90	0	90	41	0	41	46	0	46	177	0	177
6:00 PM - 7:00 PM	34	0	34	8	0	8	26	0	26	68	0	68
PASSENGER	245			97			147			489		
	99.6%			100.0%			100.0%			99.8%		
TRUCK	1			0			0			1		
	0.4%			0.0%			0.0%			0.2%		
BOTH	246			97			147			490		
	50.2%			19.8%			30.0%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	19	0	19	0	0	0	8	0	8	27	0	27
7:00 AM - 8:00 AM	33	1	34	15	1	16	32	0	32	80	2	82
8:00 AM - 9:00 AM	17	1	18	8	0	8	16	0	16	41	1	42
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	17	1	18	12	0	12	17	0	17	46	1	47
5:00 PM - 6:00 PM	49	0	49	33	0	33	30	0	30	112	0	112
6:00 PM - 7:00 PM	29	0	29	15	0	15	17	0	17	61	0	61
PASSENGER	164			83			120			367		
	98.2%			98.8%			100.0%			98.9%		
TRUCK	3			1			0			4		
	1.8%			1.2%			0.0%			1.1%		
BOTH	167			84			120			371		
	45.0%			22.6%			32.3%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	2	0	2	131	4	135	1	1	2	134	5	139
7:00 AM - 8:00 AM	15	0	15	435	32	467	21	1	22	471	33	504
8:00 AM - 9:00 AM	10	0	10	178	22	200	11	0	11	199	22	221
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	12	1	13	236	11	247	24	0	24	272	12	284
5:00 PM - 6:00 PM	23	0	23	471	18	489	52	1	53	546	19	565
6:00 PM - 7:00 PM	12	0	12	254	17	271	15	0	15	281	17	298
PASSENGER	74			1705			124			1903		
	98.7%			94.3%			97.6%			94.6%		
TRUCK	1			104			3			108		
	1.3%			5.7%			2.4%			5.4%		
BOTH	75			1809			127			2011		
	3.7%			90.0%			6.3%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	4	0	4	277	15	292	15	0	15	296	15	311
7:00 AM - 8:00 AM	15	0	15	609	37	646	67	0	67	691	37	728
8:00 AM - 9:00 AM	7	0	7	263	15	278	29	1	30	299	16	315
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	15	0	15	237	8	245	24	0	24	276	8	284
5:00 PM - 6:00 PM	24	0	24	552	15	567	53	0	53	629	15	644
6:00 PM - 7:00 PM	12	0	12	234	7	241	22	0	22	268	7	275
PASSENGER	77			2172			210			2459		
	100.0%			95.7%			99.5%			96.2%		
TRUCK	0			97			1			98		
	0.0%			4.3%			0.5%			3.8%		
BOTH	77			2269			211			2557		
	3.0%			88.7%			8.3%			100.0%		

Release 11-18-04

SR 32 & 10th STREET

TRAFFIC VOLUME COUNTS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT :	City of Noblesville
INTERSECTION :	SR 32/38 & 10th Street
DATE :	9/12/2017
COUNTED BY :	Miovision

TOTAL VEHICLES (PASSENGER CARS + TRUCKS)

	AM PEAK HOUR VOLUMES BEGINS 7:15 AM				OFF PEAK HOUR VOLUMES BEGINS				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	123	137	34	**294**					179	345	33	**557**
SOUTHBOUND	43	208	14	**265**					53	206	19	**278**
EASTBOUND	15	419	53	**487**					34	557	118	**709**
WESTBOUND	18	533	14	**565**					34	438	42	**514**

PEAK HOUR FACTOR

	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.89	0.96			0.90	0.95
SOUTHBOUND	0.93				0.77	
EASTBOUND	0.89				0.95	
WESTBOUND	0.90				0.95	

TRUCK PERCENTAGE

	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	8.1%	2.2%	2.9%	4.8%					0.0%	0.0%	0.0%	0.0%
SOUTHBOUND	0.0%	2.9%	14.3%	3.0%					0.0%	0.5%	0.0%	0.4%
EASTBOUND	0.0%	8.8%	3.8%	8.0%					0.0%	3.8%	2.5%	3.4%
WESTBOUND	0.0%	6.2%	7.1%	6.0%					0.0%	3.2%	0.0%	2.7%

HOURLY SUMMARY

HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	60	71	131	132	255	387	518
7:00 AM	TO	8:00 AM	289	247	536	492	576	1068	1604
8:00 AM	TO	9:00 AM	127	122	249	208	271	479	728
4:00 PM	TO	5:00 PM	295	125	420	347	244	591	1011
5:00 PM	TO	6:00 PM	479	290	769	676	531	1207	1976
6:00 PM	TO	7:00 PM	209	119	328	320	215	535	863
TOTAL VOLUME			1459	974	2433	2175	2092	4267	6700
PERCENTAGE			21.8%	14.5%	36.3%	32.5%	31.2%	63.7%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : SR 32/38 & 10th Street
DATE : 9/12/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	28	1	29	19	3	22	9	0	9	56	4	60
7:00 AM - 8:00 AM	104	8	112	140	8	148	27	2	29	271	18	289
8:00 AM - 9:00 AM	52	2	54	60	1	61	12	0	12	124	3	127
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	103	0	103	180	0	180	12	0	12	295	0	295
5:00 PM - 6:00 PM	159	0	159	282	0	282	38	0	38	479	0	479
6:00 PM - 7:00 PM	69	0	69	122	1	123	17	0	17	208	1	209
PASSENGER	515			803			115			1433		
	97.9%			98.4%			98.3%			98.2%		
TRUCK	11			13			2			26		
	2.1%			1.6%			1.7%			1.8%		
BOTH	526			816			117			1459		
	36.1%			55.9%			8.0%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	12	0	12	48	6	54	4	1	5	64	7	71
7:00 AM - 8:00 AM	40	0	40	186	5	191	14	2	16	240	7	247
8:00 AM - 9:00 AM	27	0	27	86	2	88	7	0	7	120	2	122
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	26	0	26	90	1	91	8	0	8	124	1	125
5:00 PM - 6:00 PM	55	0	55	206	0	206	28	1	29	289	1	290
6:00 PM - 7:00 PM	24	1	25	84	0	84	10	0	10	118	1	119
PASSENGER	184			700			71			955		
	99.5%			98.0%			94.7%			98.0%		
TRUCK	1			14			4			19		
	0.5%			2.0%			5.3%			2.0%		
BOTH	185			714			75			974		
	19.0%			73.3%			7.7%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	3	0	3	114	4	118	11	0	11	128	4	132
7:00 AM - 8:00 AM	16	0	16	402	28	430	45	1	46	463	29	492
8:00 AM - 9:00 AM	4	0	4	159	21	180	22	2	24	185	23	208
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	14	0	14	268	11	279	53	1	54	335	12	347
5:00 PM - 6:00 PM	36	0	36	509	18	527	111	2	113	656	20	676
6:00 PM - 7:00 PM	9	0	9	250	21	271	38	2	40	297	23	320
PASSENGER	82			1702			280			2064		
	100.0%			94.3%			97.2%			94.9%		
TRUCK	0			103			8			111		
	0.0%			5.7%			2.8%			5.1%		
BOTH	82			1805			288			2175		
	3.8%			83.0%			13.2%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	8	0	8	230	15	245	2	0	2	240	15	255
7:00 AM - 8:00 AM	18	0	18	515	28	543	15	0	15	548	28	576
8:00 AM - 9:00 AM	13	0	13	230	21	251	6	1	7	249	22	271
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	18	0	18	202	5	207	19	0	19	239	5	244
5:00 PM - 6:00 PM	30	0	30	453	15	468	33	0	33	516	15	531
6:00 PM - 7:00 PM	10	1	11	188	7	195	9	0	9	207	8	215
PASSENGER	97			1818			84			1999		
	99.0%			95.2%			98.8%			95.6%		
TRUCK	1			91			1			93		
	1.0%			4.8%			1.2%			4.4%		
BOTH	98			1909			85			2092		
	4.7%			91.3%			4.1%			100.0%		

Release 11-18-04

SR 32 & 8TH STREET

TRAFFIC VOLUME COUNTS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT :	City of Noblesville
INTERSECTION :	SR32/38 & 8th Street
DATE :	9/12/2017
COUNTED BY :	Miovision

TOTAL VEHICLES (PASSENGER CARS + TRUCKS)

	AM PEAK HOUR VOLUMES BEGINS 7:15 AM				OFF PEAK HOUR VOLUMES BEGINS 12:30 PM				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	222	128	5	**355**	256	171	13	**440**	298	271	11	**580**
SOUTHBOUND	18	201	9	**228**	36	154	23	**213**	27	199	25	**251**
EASTBOUND	9	479	403	**891**	21	506	398	**925**	17	664	604	**1285**
WESTBOUND	5	690	16	**711**	14	632	65	**711**	7	711	32	**750**

PEAK HOUR FACTOR

	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.87	0.97	0.96	0.98	0.90	0.98
SOUTHBOUND	0.92		0.93		0.86	
EASTBOUND	0.97		0.91		0.98	
WESTBOUND	0.93		0.96		0.95	

TRUCK PERCENTAGE

	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	7.2%	0.8%	20.0%	5.1%	8.2%	2.3%	7.7%	5.9%	0.3%	0.0%	0.0%	0.2%
SOUTHBOUND	11.1%	1.0%	0.0%	1.8%	5.6%	1.3%	0.0%	1.9%	3.7%	0.5%	0.0%	0.8%
EASTBOUND	11.1%	7.9%	3.2%	5.8%	0.0%	8.7%	4.8%	6.8%	0.0%	3.8%	1.3%	2.6%
WESTBOUND	20.0%	7.2%	0.0%	7.2%	0.0%	7.9%	1.5%	7.2%	0.0%	2.1%	3.1%	2.1%

HOURLY SUMMARY

HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	201	92	293	511	461	972	1265
7:00 AM	TO	8:00 AM	346	224	570	869	702	1571	2141
8:00 AM	TO	9:00 AM	373	231	604	896	659	1555	2159
10:00 AM	TO	11:00 AM	337	163	500	855	536	1391	1891
11:00 AM	TO	12:00 PM	368	174	542	858	573	1431	1973
12:00 PM	TO	1:00 PM	416	208	624	914	674	1588	2212
1:00 PM	TO	2:00 PM	443	216	659	866	697	1563	2222
2:00 PM	TO	3:00 PM	480	177	657	933	694	1627	2284
3:00 PM	TO	4:00 PM	467	229	696	1004	629	1633	2329
4:00 PM	TO	5:00 PM	563	243	806	1203	725	1928	2734
5:00 PM	TO	6:00 PM	603	220	823	1241	724	1965	2788
6:00 PM	TO	7:00 PM	468	159	627	968	597	1565	2192
TOTAL VOLUME			5065	2336	7401	11118	7671	18789	26190
PERCENTAGE			19.3%	8.9%	28.3%	42.5%	29.3%	71.7%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : SR32/38 & 8th Street
DATE : 9/12/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	150	2	152	45	0	45	3	1	4	198	3	201
7:00 AM - 8:00 AM	209	11	220	117	1	118	8	0	8	334	12	346
8:00 AM - 9:00 AM	209	19	228	136	3	139	5	1	6	350	23	373
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	206	10	216	98	7	105	14	2	16	318	19	337
11:00 AM - 12:00 PM	231	12	243	100	2	102	23	0	23	354	14	368
12:00 PM - 1:00 PM	246	8	254	139	3	142	20	0	20	405	11	416
1:00 PM - 2:00 PM	226	28	254	174	4	178	10	1	11	410	33	443
2:00 PM - 3:00 PM	272	9	281	175	5	180	19	0	19	466	14	480
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	262	7	269	185	3	188	8	2	10	455	12	467
4:00 PM - 5:00 PM	299	3	302	247	1	248	13	0	13	559	4	563
5:00 PM - 6:00 PM	315	4	319	275	0	275	9	0	9	599	4	603
6:00 PM - 7:00 PM	271	4	275	184	0	184	9	0	9	464	4	468
PASSENGER	2896			1875			141			4912		
	96.1%			98.5%			95.3%			97.0%		
TRUCK	117			29			7			153		
	3.9%			1.5%			4.7%			3.0%		
BOTH	3013			1904			148			5065		
	59.5%			37.6%			2.9%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	5	0	5	84	0	84	3	0	3	92	0	92
7:00 AM - 8:00 AM	13	2	15	198	1	199	10	0	10	221	3	224
8:00 AM - 9:00 AM	21	1	22	192	3	195	14	0	14	227	4	231
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	31	0	31	111	9	120	12	0	12	154	9	163
11:00 AM - 12:00 PM	24	2	26	131	3	134	13	1	14	168	6	174
12:00 PM - 1:00 PM	35	1	36	147	2	149	23	0	23	205	3	208
1:00 PM - 2:00 PM	34	1	35	154	4	158	23	0	23	211	5	216
2:00 PM - 3:00 PM	18	1	19	125	4	129	28	1	29	171	6	177
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	25	0	25	170	5	175	28	1	29	223	6	229
4:00 PM - 5:00 PM	24	3	27	193	1	194	22	0	22	239	4	243
5:00 PM - 6:00 PM	20	0	20	186	1	187	13	0	13	219	1	220
6:00 PM - 7:00 PM	20	1	21	133	1	134	4	0	4	157	2	159
PASSENGER	270			1824			193			2287		
	95.7%			98.2%			98.5%			97.9%		
TRUCK	12			34			3			49		
	4.3%			1.8%			1.5%			2.1%		
BOTH	282			1858			196			2336		
	12.1%			79.5%			8.4%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	1	0	1	222	11	233	273	4	277	496	15	511
7:00 AM - 8:00 AM	8	1	9	450	28	478	370	12	382	828	41	869
8:00 AM - 9:00 AM	20	0	20	392	45	437	432	7	439	844	52	896
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	18	0	18	449	47	496	329	12	341	796	59	855
11:00 AM - 12:00 PM	16	1	17	433	45	478	351	12	363	800	58	858
12:00 PM - 1:00 PM	28	0	28	467	36	503	378	5	383	873	41	914
1:00 PM - 2:00 PM	13	0	13	427	53	480	351	22	373	791	75	866
2:00 PM - 3:00 PM	15	0	15	473	54	527	371	20	391	859	74	933
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	17	0	17	495	38	533	441	13	454	953	51	1004
4:00 PM - 5:00 PM	17	0	17	608	26	634	541	11	552	1166	37	1203
5:00 PM - 6:00 PM	16	0	16	624	21	645	574	6	580	1214	27	1241
6:00 PM - 7:00 PM	14	0	14	534	26	560	391	3	394	939	29	968
PASSENGER	183			5574			4802			10559		
	98.9%			92.8%			97.4%			95.0%		
TRUCK	2			430			127			559		
	1.1%			7.2%			2.6%			5.0%		
BOTH	185			6004			4929			11118		
	1.7%			54.0%			44.3%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	4	0	4	428	26	454	3	0	3	435	26	461
7:00 AM - 8:00 AM	4	1	5	644	38	682	15	0	15	663	39	702
8:00 AM - 9:00 AM	3	0	3	575	54	629	27	0	27	605	54	659
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	9	1	10	456	42	498	28	0	28	493	43	536
11:00 AM - 12:00 PM	7	1	8	502	40	542	23	0	23	532	41	573
12:00 PM - 1:00 PM	15	0	15	548	41	589	70	0	70	633	41	674
1:00 PM - 2:00 PM	10	2	12	584	47	631	53	1	54	647	50	697
2:00 PM - 3:00 PM	11	0	11	601	46	647	36	0	36	648	46	694
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	6	2	8	545	35	580	41	0	41	592	37	629
4:00 PM - 5:00 PM	10	0	10	660	19	679	36	0	36	706	19	725
5:00 PM - 6:00 PM	7	0	7	680	15	695	21	1	22	708	16	724
6:00 PM - 7:00 PM	2	0	2	558	8	566	29	0	29	589	8	597
PASSENGER	88			6781			382			7251		
	92.6%			94.3%			99.5%			94.5%		
TRUCK	7			411			2			420		
	7.4%			5.7%			0.5%			5.5%		
BOTH	95			7192			384			7671		
	1.2%			93.8%			5.0%			100.0%		

Release 11-18-04

SR 32 & HIGHWAY 19

TRAFFIC VOLUME COUNTS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT :	City of Noblesville
INTERSECTION :	SR32/38 & HWY 19
DATE :	9/12/2017
COUNTED BY :	Miovision

TOTAL VEHICLES (PASSENGER CARS + TRUCKS)

	AM PEAK HOUR VOLUMES BEGINS 7:00 AM				OFF PEAK HOUR VOLUMES BEGINS 2:00 PM				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
SOUTHBOUND	140		245	**385**	47		116	**163**	57		118	**175**
EASTBOUND	157	834		**991**	134	914		**1048**	243	1208		**1451**
WESTBOUND		858	30	**888**		897	47	**944**		1009	48	**1057**

PEAK HOUR FACTOR

	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
SOUTHBOUND	0.88		0.91		0.88	
EASTBOUND	0.90	0.95	0.98	0.97	0.98	0.96
WESTBOUND	0.88		0.96		0.91	

TRUCK PERCENTAGE

	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
SOUTHBOUND	1.4%		5.3%	3.9%	0.0%		13.8%	9.8%	1.8%		2.5%	2.3%
EASTBOUND	7.6%	5.2%		5.5%	5.2%	7.9%		7.5%	1.2%	3.1%		2.8%
WESTBOUND		5.6%	13.3%	5.9%		6.7%	0.0%	6.4%		1.4%	0.0%	1.3%

HOURLY SUMMARY

HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM		182	182	549	608	1157	1339
7:00 AM	TO	8:00 AM		385	385	991	888	1879	2264
8:00 AM	TO	9:00 AM		287	287	924	857	1781	2068
10:00 AM	TO	11:00 AM		137	137	844	724	1568	1705
11:00 AM	TO	12:00 PM		147	147	934	792	1726	1873
12:00 PM	TO	1:00 PM		167	167	959	854	1813	1980
1:00 PM	TO	2:00 PM		171	171	909	903	1812	1983
2:00 PM	TO	3:00 PM		163	163	1048	944	1992	2155
3:00 PM	TO	4:00 PM		173	173	1121	884	2005	2178
4:00 PM	TO	5:00 PM		176	176	1395	1029	2424	2600
5:00 PM	TO	6:00 PM		171	171	1408	1012	2420	2591
6:00 PM	TO	7:00 PM		148	148	1104	836	1940	2088
TOTAL VOLUME				2307	2307	12186	10331	22517	24824
PERCENTAGE				9.3%	9.3%	49.1%	41.6%	90.7%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : SR32/38 & HWY 19
DATE : 9/12/2017

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	54	0	54				115	13	128	169	13	182
7:00 AM - 8:00 AM	138	2	140				232	13	245	370	15	385
8:00 AM - 9:00 AM	100	6	106				170	11	181	270	17	287
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	70	4	74				55	8	63	125	12	137
11:00 AM - 12:00 PM	59	4	63				79	5	84	138	9	147
12:00 PM - 1:00 PM	77	4	81				78	8	86	155	12	167
1:00 PM - 2:00 PM	69	7	76				88	7	95	157	14	171
2:00 PM - 3:00 PM	47	0	47				100	16	116	147	16	163
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	67	1	68				95	10	105	162	11	173
4:00 PM - 5:00 PM	59	1	60				111	5	116	170	6	176
5:00 PM - 6:00 PM	51	1	52				117	2	119	168	3	171
6:00 PM - 7:00 PM	63	1	64				84	0	84	147	1	148
PASSENGER	854 96.5%						1324 93.1%			2178 94.4%		
TRUCK	31 3.5%						98 6.9%			129 5.6%		
BOTH	885 38.4%						1422 61.6%			2307 100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	70	2	72	464	13	477				534	15	549
7:00 AM - 8:00 AM	145	12	157	791	43	834				936	55	991
8:00 AM - 9:00 AM	82	35	117	757	50	807				839	85	924
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	80	7	87	708	49	757				788	56	844
11:00 AM - 12:00 PM	96	8	104	775	55	830				871	63	934
12:00 PM - 1:00 PM	104	12	116	806	37	843				910	49	959
1:00 PM - 2:00 PM	100	4	104	730	75	805				830	79	909
2:00 PM - 3:00 PM	127	7	134	842	72	914				969	79	1048
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	158	10	168	907	46	953				1065	56	1121
4:00 PM - 5:00 PM	222	12	234	1122	39	1161				1344	51	1395
5:00 PM - 6:00 PM	222	4	226	1152	30	1182				1374	34	1408
6:00 PM - 7:00 PM	190	1	191	881	32	913				1071	33	1104
PASSENGER	1596 93.3%			9935 94.8%						11531 94.6%		
TRUCK	114 6.7%			541 5.2%						655 5.4%		
BOTH	1710 14.0%			10476 86.0%						12186 100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM				567	24	591	15	2	17	582	26	608
7:00 AM - 8:00 AM				810	48	858	26	4	30	836	52	888
8:00 AM - 9:00 AM				772	65	837	19	1	20	791	66	857
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM				639	46	685	35	4	39	674	50	724
11:00 AM - 12:00 PM				717	49	766	24	2	26	741	51	792
12:00 PM - 1:00 PM				758	47	805	44	5	49	802	52	854
1:00 PM - 2:00 PM				791	75	866	36	1	37	827	76	903
2:00 PM - 3:00 PM				837	60	897	47	0	47	884	60	944
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM				796	44	840	44	0	44	840	44	884
4:00 PM - 5:00 PM				951	19	970	58	1	59	1009	20	1029
5:00 PM - 6:00 PM				953	18	971	41	0	41	994	18	1012
6:00 PM - 7:00 PM				784	13	797	38	1	39	822	14	836
PASSENGER				9375 94.9%			427 95.3%			9802 94.9%		
TRUCK				508 5.1%			21 4.7%			529 5.1%		
BOTH				9883 95.7%			448 4.3%			10331 100.0%		

Release 11-18-04

SR 32 & SR 38

TRAFFIC VOLUME COUNTS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT :	City of Noblesville
INTERSECTION :	SR 32 & SR 38
DATE :	9/6/2017
COUNTED BY :	Miovision

	TOTAL VEHICLES (PASSENGER CARS + TRUCKS)											
	AM PEAK HOUR VOLUMES BEGINS 7:00 AM				OFF PEAK HOUR VOLUMES BEGINS				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	19	16	8	**43**					37	36	38	**111**
SOUTHBOUND	336	37	81	**454**					418	21	86	**525**
EASTBOUND	21	665	39	**725**					88	946	17	**1051**
WESTBOUND	29	695	271	**995**					22	687	394	**1103**

	PEAK HOUR FACTOR					
	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.77	0.98			0.73	0.98
SOUTHBOUND	0.95				0.91	
EASTBOUND	0.83				0.94	
WESTBOUND	0.93				0.96	

	TRUCK PERCENTAGE											
	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	5.3%	0.0%	0.0%	2.3%					0.0%	2.8%	0.0%	0.9%
SOUTHBOUND	4.5%	0.0%	3.7%	4.0%					3.8%	4.8%	0.0%	3.2%
EASTBOUND	14.3%	6.8%	5.1%	6.9%					2.3%	1.4%	0.0%	1.4%
WESTBOUND	0.0%	6.2%	4.8%	5.6%					0.0%	1.9%	1.5%	1.7%

HOURLY SUMMARY								
HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	9	192	201	203	413	616	817
7:00 AM	TO	8:00 AM	43	454	497	725	995	1720	2217
8:00 AM	TO	9:00 AM	19	223	242	306	478	784	1026
4:00 PM	TO	5:00 PM	60	284	344	500	530	1030	1374
5:00 PM	TO	6:00 PM	92	483	575	1073	1095	2168	2743
6:00 PM	TO	7:00 PM	45	213	258	485	438	923	1181
TOTAL VOLUME			268	1849	2117	3292	3949	7241	9358
PERCENTAGE			2.9%	19.8%	22.6%	35.2%	42.2%	77.4%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : SR 32 & SR 38
DATE : 9/6/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	5	0	5	1	0	1	3	0	3	9	0	9
7:00 AM - 8:00 AM	18	1	19	16	0	16	8	0	8	42	1	43
8:00 AM - 9:00 AM	9	2	11	2	0	2	6	0	6	17	2	19
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	17	0	17	20	1	21	22	0	22	59	1	60
5:00 PM - 6:00 PM	39	0	39	27	0	27	26	0	26	92	0	92
6:00 PM - 7:00 PM	20	0	20	8	1	9	16	0	16	44	1	45
PASSENGER	108			74			81			263		
	97.3%			97.4%			100.0%			98.1%		
TRUCK	3			2			0			5		
	2.7%			2.6%			0.0%			1.9%		
BOTH	111			76			81			268		
	41.4%			28.4%			30.2%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	138	3	141	26	0	26	25	0	25	189	3	192
7:00 AM - 8:00 AM	321	15	336	37	0	37	78	3	81	436	18	454
8:00 AM - 9:00 AM	156	9	165	22	0	22	34	2	36	212	11	223
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	211	8	219	11	1	12	53	0	53	275	9	284
5:00 PM - 6:00 PM	378	10	388	16	1	17	78	0	78	472	11	483
6:00 PM - 7:00 PM	163	8	171	3	0	3	39	0	39	205	8	213
PASSENGER	1367			115			307			1789		
	96.3%			98.3%			98.4%			96.8%		
TRUCK	53			2			5			60		
	3.7%			1.7%			1.6%			3.2%		
BOTH	1420			117			312			1849		
	76.8%			6.3%			16.9%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	0	1	1	176	6	182	20	0	20	196	7	203
7:00 AM - 8:00 AM	18	3	21	620	45	665	37	2	39	675	50	725
8:00 AM - 9:00 AM	16	1	17	247	21	268	21	0	21	284	22	306
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	44	1	45	443	6	449	6	0	6	493	7	500
5:00 PM - 6:00 PM	84	1	85	951	18	969	19	0	19	1054	19	1073
6:00 PM - 7:00 PM	51	0	51	420	13	433	1	0	1	472	13	485
PASSENGER	213			2857			104			3174		
	96.8%			96.3%			98.1%			96.4%		
TRUCK	7			109			2			118		
	3.2%			3.7%			1.9%			3.6%		
BOTH	220			2966			106			3292		
	6.7%			90.1%			3.2%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	9	0	9	291	16	307	88	9	97	388	25	413
7:00 AM - 8:00 AM	29	0	29	652	43	695	258	13	271	939	56	995
8:00 AM - 9:00 AM	20	1	21	311	30	341	103	13	116	434	44	478
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	9	0	9	316	7	323	194	4	198	519	11	530
5:00 PM - 6:00 PM	19	0	19	687	18	705	364	7	371	1070	25	1095
6:00 PM - 7:00 PM	1	0	1	287	4	291	142	4	146	430	8	438
PASSENGER	87			2544			1149			3780		
	98.9%			95.6%			95.8%			95.7%		
TRUCK	1			118			50			169		
	1.1%			4.4%			4.2%			4.3%		
BOTH	88			2662			1199			3949		
	2.2%			67.4%			30.4%			100.0%		

Release 11-18-04

SR 32 & RIVER ROAD

TRAFFIC VOLUME COUNTS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT :	City of Noblesville
INTERSECTION :	SR 32 & River Road
DATE :	9/6/2017
COUNTED BY :	Miovision

TOTAL VEHICLES (PASSENGER CARS + TRUCKS)

	AM PEAK HOUR VOLUMES BEGINS 7:00 AM				OFF PEAK HOUR VOLUMES BEGINS 2:00 PM				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	77	71	99	**247**	125	97	103	**325**	140	134	187	**461**
SOUTHBOUND	12	130	69	**211**	43	104	61	**208**	62	140	103	**305**
EASTBOUND	20	638	56	**714**	51	594	71	**716**	72	699	57	**828**
WESTBOUND	91	688	28	**807**	89	606	39	**734**	119	657	23	**799**

PEAK HOUR FACTOR

	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.87	0.94	0.90	0.92	0.92	0.98
SOUTHBOUND	0.74		0.96		0.89	
EASTBOUND	0.94		0.92		0.94	
WESTBOUND	0.94		0.88		0.98	

TRUCK PERCENTAGE

	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	20.8%	11.3%	13.1%	15.0%	21.6%	12.4%	5.8%	13.8%	5.7%	5.2%	2.1%	4.1%
SOUTHBOUND	0.0%	6.2%	2.9%	4.7%	0.0%	15.4%	3.3%	8.7%	0.0%	7.1%	0.0%	3.3%
EASTBOUND	0.0%	3.6%	17.9%	4.6%	3.9%	6.4%	42.3%	9.8%	0.0%	2.7%	15.8%	3.4%
WESTBOUND	4.4%	5.8%	3.6%	5.6%	9.0%	7.3%	5.1%	7.4%	3.4%	2.4%	4.3%	2.6%

HOURLY SUMMARY

HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	108	128	236	295	492	787	1023
7:00 AM	TO	8:00 AM	247	211	458	714	807	1521	1979
8:00 AM	TO	9:00 AM	227	228	455	661	684	1345	1800
10:00 AM	TO	11:00 AM	237	152	389	564	568	1132	1521
11:00 AM	TO	12:00 PM	286	199	485	638	577	1215	1700
12:00 PM	TO	1:00 PM	314	191	505	654	687	1341	1846
1:00 PM	TO	2:00 PM	289	207	496	719	677	1396	1892
2:00 PM	TO	3:00 PM	325	208	533	716	734	1450	1983
3:00 PM	TO	4:00 PM	389	248	637	749	705	1454	2091
4:00 PM	TO	5:00 PM	412	265	677	807	780	1587	2264
5:00 PM	TO	6:00 PM	474	288	762	824	789	1613	2375
6:00 PM	TO	7:00 PM	304	204	508	809	598	1407	1915
TOTAL VOLUME			3612	2529	6141	8150	8098	16248	22389
PERCENTAGE			16.1%	11.3%	27.4%	36.4%	36.2%	72.6%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : SR 32 & River Road
DATE : 9/6/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	33	4	37	15	2	17	53	1	54	101	7	108
7:00 AM - 8:00 AM	61	16	77	63	8	71	86	13	99	210	37	247
8:00 AM - 9:00 AM	49	21	70	60	13	73	77	7	84	186	41	227
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	35	23	58	57	14	71	99	9	108	191	46	237
11:00 AM - 12:00 PM	78	24	102	66	18	84	93	7	100	237	49	286
12:00 PM - 1:00 PM	79	38	117	83	10	93	95	9	104	257	57	314
1:00 PM - 2:00 PM	73	33	106	71	10	81	95	7	102	239	50	289
2:00 PM - 3:00 PM	98	27	125	85	12	97	97	6	103	280	45	325
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	99	34	133	111	10	121	121	14	135	331	58	389
4:00 PM - 5:00 PM	123	13	136	119	5	124	146	6	152	388	24	412
5:00 PM - 6:00 PM	136	6	142	133	6	139	189	4	193	458	16	474
6:00 PM - 7:00 PM	106	5	111	75	3	78	109	6	115	290	14	304
PASSENGER	970			938			1260			3168		
	79.9%			89.4%			93.4%			87.7%		
TRUCK	244			111			89			444		
	20.1%			10.6%			6.6%			12.3%		
BOTH	1214			1049			1349			3612		
	33.6%			29.0%			37.3%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	11	1	12	85	1	86	28	2	30	124	4	128
7:00 AM - 8:00 AM	12	0	12	122	8	130	67	2	69	201	10	211
8:00 AM - 9:00 AM	20	2	22	123	12	135	70	1	71	213	15	228
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	36	1	37	60	10	70	44	1	45	140	12	152
11:00 AM - 12:00 PM	68	1	69	63	14	77	52	1	53	183	16	199
12:00 PM - 1:00 PM	50	3	53	57	16	73	64	1	65	171	20	191
1:00 PM - 2:00 PM	45	3	48	90	8	98	61	0	61	196	11	207
2:00 PM - 3:00 PM	43	0	43	88	16	104	59	2	61	190	18	208
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	47	0	47	108	14	122	77	2	79	232	16	248
4:00 PM - 5:00 PM	59	0	59	112	10	122	82	2	84	253	12	265
5:00 PM - 6:00 PM	52	0	52	121	12	133	102	1	103	275	13	288
6:00 PM - 7:00 PM	43	0	43	90	8	98	63	0	63	196	8	204
PASSENGER	486			1119			769			2374		
	97.8%			89.7%			98.1%			93.9%		
TRUCK	11			129			15			155		
	2.2%			10.3%			1.9%			6.1%		
BOTH	497			1248			784			2529		
	19.7%			49.3%			31.0%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	3	0	3	256	13	269	20	3	23	279	16	295
7:00 AM - 8:00 AM	20	0	20	615	23	638	46	10	56	681	33	714
8:00 AM - 9:00 AM	42	2	44	499	53	552	46	19	65	587	74	661
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	27	1	28	438	39	477	38	21	59	503	61	564
11:00 AM - 12:00 PM	33	0	33	524	27	551	29	25	54	586	52	638
12:00 PM - 1:00 PM	42	0	42	495	45	540	39	33	72	576	78	654
1:00 PM - 2:00 PM	54	1	55	553	40	593	43	28	71	650	69	719
2:00 PM - 3:00 PM	49	2	51	556	38	594	41	30	71	646	70	716
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	43	3	46	613	27	640	38	25	63	694	55	749
4:00 PM - 5:00 PM	67	2	69	636	33	669	53	16	69	756	51	807
5:00 PM - 6:00 PM	50	0	50	707	13	720	50	4	54	807	17	824
6:00 PM - 7:00 PM	41	0	41	711	11	722	44	2	46	796	13	809
PASSENGER	471			6603			487			7561		
	97.7%			94.8%			69.3%			92.8%		
TRUCK	11			362			216			589		
	2.3%			5.2%			30.7%			7.2%		
BOTH	482			6965			703			8150		
	5.9%			85.5%			8.6%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	48	4	52	417	17	434	5	1	6	470	22	492
7:00 AM - 8:00 AM	87	4	91	648	40	688	27	1	28	762	45	807
8:00 AM - 9:00 AM	62	8	70	554	33	587	25	2	27	641	43	684
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	66	12	78	421	30	451	39	0	39	526	42	568
11:00 AM - 12:00 PM	71	7	78	428	29	457	40	2	42	539	38	577
12:00 PM - 1:00 PM	95	5	100	485	55	540	43	4	47	623	64	687
1:00 PM - 2:00 PM	75	8	83	520	35	555	38	1	39	633	44	677
2:00 PM - 3:00 PM	81	8	89	562	44	606	37	2	39	680	54	734
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	102	4	106	550	22	572	27	0	27	679	26	705
4:00 PM - 5:00 PM	113	3	116	635	18	653	11	0	11	759	21	780
5:00 PM - 6:00 PM	106	5	111	636	14	650	26	2	28	768	21	789
6:00 PM - 7:00 PM	63	0	63	500	7	507	28	0	28	591	7	598
PASSENGER	969			6356			346			7671		
	93.4%			94.9%			95.8%			94.7%		
TRUCK	68			344			15			427		
	6.6%			5.1%			4.2%			5.3%		
BOTH	1037			6700			361			8098		
	12.8%			82.7%			4.5%			100.0%		

Release 11-18-04

SR 32 & CHERRY TREE ROAD

TRAFFIC VOLUME COUNTS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT :	City of Noblesville
INTERSECTION :	SR 32 & Cherry Tree Road
DATE :	9/6/2017
COUNTED BY :	Miovision

TOTAL VEHICLES (PASSENGER CARS + TRUCKS)

	AM PEAK HOUR VOLUMES BEGINS 7:00 AM				OFF PEAK HOUR VOLUMES BEGINS 2:00 PM				PM PEAK HOUR VOLUMES BEGINS 5:00 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	4		78	**82**	5		62	**67**	3		102	**105**
EASTBOUND		662	6	**668**		673	8	**681**		803	12	**815**
WESTBOUND	24	816		**840**	49	739		**788**	79	850		**929**

PEAK HOUR FACTOR

	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.73		0.73		0.94	
EASTBOUND	0.93	0.98	0.89	0.85	0.95	0.98
WESTBOUND	0.94		0.84		0.94	

TRUCK PERCENTAGE

	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	0.0%		2.6%	12.2%	0.0%		1.6%	19.4%	0.0%		0.0%	6.7%
EASTBOUND		5.6%	0.0%	5.5%		9.7%	25.0%	10.1%		1.9%	8.3%	2.0%
WESTBOUND	8.3%	8.8%		8.9%	4.1%	9.9%		9.8%	0.0%	2.8%		2.7%

HOURLY SUMMARY

HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	28		28	313	519	832	860
7:00 AM	TO	8:00 AM	82		82	668	840	1508	1590
8:00 AM	TO	9:00 AM	62		62	680	731	1411	1473
10:00 AM	TO	11:00 AM	42		42	535	537	1072	1114
11:00 AM	TO	12:00 PM	59		59	598	610	1208	1267
12:00 PM	TO	1:00 PM	54		54	612	689	1301	1355
1:00 PM	TO	2:00 PM	68		68	680	724	1404	1472
2:00 PM	TO	3:00 PM	67		67	681	788	1469	1536
3:00 PM	TO	4:00 PM	63		63	739	812	1551	1614
4:00 PM	TO	5:00 PM	93		93	785	873	1658	1751
5:00 PM	TO	6:00 PM	105		105	815	929	1744	1849
6:00 PM	TO	7:00 PM	113		113	724	676	1400	1513
TOTAL VOLUME			836		836	7830	8728	16558	17394
PERCENTAGE			4.8%		4.8%	45.0%	50.2%	95.2%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : SR 32 & Cherry Tree Road
DATE : 9/6/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	0	0	0				28	0	28	28	0	28
7:00 AM - 8:00 AM	4	0	4				76	2	78	80	2	82
8:00 AM - 9:00 AM	3	0	3				58	1	59	61	1	62
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	4	0	4				37	1	38	41	1	42
11:00 AM - 12:00 PM	3	0	3				56	0	56	59	0	59
12:00 PM - 1:00 PM	4	0	4				44	6	50	48	6	54
1:00 PM - 2:00 PM	5	0	5				60	3	63	65	3	68
2:00 PM - 3:00 PM	5	0	5				61	1	62	66	1	67
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	2	1	3				56	4	60	58	5	63
4:00 PM - 5:00 PM	5	0	5				84	4	88	89	4	93
5:00 PM - 6:00 PM	3	0	3				102	0	102	105	0	105
6:00 PM - 7:00 PM	11	0	11				102	0	102	113	0	113
PASSENGER	49						764			813		
	98.0%						97.2%			97.2%		
TRUCK	1						22			23		
	2.0%						2.8%			2.8%		
BOTH	50						786			836		
	6.0%						94.0%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM				296	14	310	3	0	3	299	14	313
7:00 AM - 8:00 AM				625	37	662	6	0	6	631	37	668
8:00 AM - 9:00 AM				595	80	675	5	0	5	600	80	680
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM				470	57	527	8	0	8	478	57	535
11:00 AM - 12:00 PM				530	65	595	3	0	3	533	65	598
12:00 PM - 1:00 PM				535	71	606	5	1	6	540	72	612
1:00 PM - 2:00 PM				611	63	674	6	0	6	617	63	680
2:00 PM - 3:00 PM				608	65	673	6	2	8	614	67	681
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM				669	64	733	6	0	6	675	64	739
4:00 PM - 5:00 PM				729	38	767	17	1	18	746	39	785
5:00 PM - 6:00 PM				788	15	803	11	1	12	799	16	815
6:00 PM - 7:00 PM				703	9	712	12	0	12	715	9	724
PASSENGER				7159			88			7247		
				92.5%			94.6%			92.6%		
TRUCK				578			5			583		
				7.5%			5.4%			7.4%		
BOTH				7737			93			7830		
				98.8%			1.2%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	15	7	22	476	21	497				491	28	519
7:00 AM - 8:00 AM	22	2	24	744	72	816				766	74	840
8:00 AM - 9:00 AM	29	0	29	636	66	702				665	66	731
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	29	2	31	452	54	506				481	56	537
11:00 AM - 12:00 PM	32	1	33	525	52	577				557	53	610
12:00 PM - 1:00 PM	31	0	31	564	94	658				595	94	689
1:00 PM - 2:00 PM	52	1	53	604	67	671				656	68	724
2:00 PM - 3:00 PM	47	2	49	666	73	739				713	75	788
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	65	0	65	691	56	747				756	56	812
4:00 PM - 5:00 PM	66	1	67	774	32	806				840	33	873
5:00 PM - 6:00 PM	79	0	79	826	24	850				905	24	929
6:00 PM - 7:00 PM	57	0	57	607	12	619				664	12	676
PASSENGER	524			7565						8089		
	97.0%			92.4%						92.7%		
TRUCK	16			623						639		
	3.0%			7.6%						7.3%		
BOTH	540			8188						8728		
	6.2%			93.8%						100.0%		

Release 11-18-04

PLEASANT STREET & SR 37

TRAFFIC VOLUME COUNTS
CAPACITY ANALYSIS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT :	City of Noblesville
INTERSECTION :	Pleasant Street & SR 37
DATE :	9/13/2017
COUNTED BY :	Miovision

TOTAL VEHICLES (PASSENGER CARS + TRUCKS)

	AM PEAK HOUR VOLUMES BEGINS 7:00 AM				OFF PEAK HOUR VOLUMES BEGINS				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	64	829	61	**954**					169	878	69	**1116**
SOUTHBOUND	124	1292	94	**1510**					253	888	121	**1262**
EASTBOUND	62	95	42	**199**					162	294	104	**560**
WESTBOUND	52	108	120	**280**					66	244	331	**641**

PEAK HOUR FACTOR

	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.91	0.96			0.90	1.00
SOUTHBOUND	0.92				0.93	
EASTBOUND	0.82				0.95	
WESTBOUND	0.90				0.82	

TRUCK PERCENTAGE

	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	1.6%	5.5%	0.0%	4.9%					1.2%	3.2%	1.4%	2.8%
SOUTHBOUND	8.1%	2.8%	5.3%	3.4%					0.4%	3.3%	1.7%	2.5%
EASTBOUND	6.5%	4.2%	2.4%	4.5%					0.0%	0.3%	3.8%	0.9%
WESTBOUND	1.9%	1.9%	3.3%	2.5%					0.0%	0.8%	0.9%	0.8%

HOURLY SUMMARY

HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	315	698	1013	66	87	153	1166
7:00 AM	TO	8:00 AM	954	1510	2464	199	280	479	2943
8:00 AM	TO	9:00 AM	341	662	1003	113	151	264	1267
4:00 PM	TO	5:00 PM	578	645	1223	277	286	563	1786
5:00 PM	TO	6:00 PM	1103	1211	2314	563	672	1235	3549
6:00 PM	TO	7:00 PM	696	550	1246	260	296	556	1802
TOTAL VOLUME			3987	5276	9263	1478	1772	3250	12513
PERCENTAGE			31.9%	42.2%	74.0%	11.8%	14.2%	26.0%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & SR 37
DATE : 9/13/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	16	1	17	249	20	269	29	0	29	294	21	315
7:00 AM - 8:00 AM	63	1	64	783	46	829	61	0	61	907	47	954
8:00 AM - 9:00 AM	37	0	37	263	17	280	22	2	24	322	19	341
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	89	2	91	432	20	452	34	1	35	555	23	578
5:00 PM - 6:00 PM	146	0	146	876	14	890	67	0	67	1089	14	1103
6:00 PM - 7:00 PM	82	1	83	557	7	564	49	0	49	688	8	696
PASSENGER	433			3160			262			3855		
	98.9%			96.2%			98.9%			96.7%		
TRUCK	5			124			3			132		
	1.1%			3.8%			1.1%			3.3%		
BOTH	438			3284			265			3987		
	11.0%			82.4%			6.6%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	31	2	33	604	30	634	31	0	31	666	32	698
7:00 AM - 8:00 AM	114	10	124	1256	36	1292	89	5	94	1459	51	1510
8:00 AM - 9:00 AM	63	2	65	525	26	551	41	5	46	629	33	662
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	129	0	129	438	15	453	61	2	63	628	17	645
5:00 PM - 6:00 PM	244	1	245	836	26	862	104	0	104	1184	27	1211
6:00 PM - 7:00 PM	117	0	117	379	9	388	45	0	45	541	9	550
PASSENGER	698			4038			371			5107		
	97.9%			96.6%			96.9%			96.8%		
TRUCK	15			142			12			169		
	2.1%			3.4%			3.1%			3.2%		
BOTH	713			4180			383			5276		
	13.5%			79.2%			7.3%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	19	1	20	31	2	33	12	1	13	62	4	66
7:00 AM - 8:00 AM	58	4	62	91	4	95	41	1	42	190	9	199
8:00 AM - 9:00 AM	22	5	27	54	2	56	29	1	30	105	8	113
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	89	0	89	133	1	134	53	1	54	275	2	277
5:00 PM - 6:00 PM	146	0	146	326	2	328	86	3	89	558	5	563
6:00 PM - 7:00 PM	76	0	76	143	1	144	40	0	40	259	1	260
PASSENGER	410			778			261			1449		
	97.6%			98.5%			97.4%			98.0%		
TRUCK	10			12			7			29		
	2.4%			1.5%			2.6%			2.0%		
BOTH	420			790			268			1478		
	28.4%			53.5%			18.1%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	16	0	16	40	0	40	31	0	31	87	0	87
7:00 AM - 8:00 AM	51	1	52	106	2	108	116	4	120	273	7	280
8:00 AM - 9:00 AM	19	3	22	67	1	68	56	5	61	142	9	151
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	27	0	27	108	0	108	148	3	151	283	3	286
5:00 PM - 6:00 PM	65	0	65	256	3	259	348	0	348	669	3	672
6:00 PM - 7:00 PM	38	0	38	91	0	91	166	1	167	295	1	296
PASSENGER	216			668			865			1749		
	98.2%			99.1%			98.5%			98.7%		
TRUCK	4			6			13			23		
	1.8%			0.9%			1.5%			1.3%		
BOTH	220			674			878			1772		
	12.4%			38.0%			49.5%			100.0%		

Release 11-18-04

PLEASANT STREET & CLOVER ROAD

TRAFFIC VOLUME COUNTS
CAPACITY ANALYSIS
QUEUE LENGTH ANALYSIS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & Clover Road
DATE : 9/13/2017
COUNTED BY : Miovision

	TOTAL VEHICLES (PASSENGER CARS + TRUCKS)											
	AM PEAK HOUR VOLUMES BEGINS 7:30 AM				OFF PEAK HOUR VOLUMES BEGINS				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	62	23	52	**137**					208	113	110	**431**
SOUTHBOUND	3	6	3	**12**					46	70	24	**140**
EASTBOUND	10	173	78	**261**					66	397	275	**738**
WESTBOUND	87	206	3	**296**					156	354	15	**525**

	PEAK HOUR FACTOR					
	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.93	0.88			0.86	0.94
SOUTHBOUND	0.75				0.95	
EASTBOUND	0.89				0.92	
WESTBOUND	0.84				0.91	

	TRUCK PERCENTAGE											
	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	3.2%	8.7%	3.8%	4.4%					0.0%	0.0%	0.0%	0.0%
SOUTHBOUND	0.0%	0.0%	0.0%	0.0%					0.0%	0.0%	0.0%	0.0%
EASTBOUND	0.0%	8.7%	1.3%	6.1%					0.0%	1.0%	0.0%	0.5%
WESTBOUND	1.1%	3.9%	0.0%	3.0%					0.6%	1.1%	0.0%	1.0%

HOURLY SUMMARY								
HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	33	7	40	79	90	169	209
7:00 AM	TO	8:00 AM	125	9	134	218	274	492	626
8:00 AM	TO	9:00 AM	64	7	71	145	143	288	359
4:00 PM	TO	5:00 PM	225	70	295	359	268	627	922
5:00 PM	TO	6:00 PM	401	129	530	703	483	1186	1716
6:00 PM	TO	7:00 PM	185	59	244	285	203	488	732
TOTAL VOLUME			1033	281	1314	1789	1461	3250	4564
PERCENTAGE			22.6%	6.2%	28.8%	39.2%	32.0%	71.2%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & Clover Road
DATE : 9/13/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	8	0	8	5	0	5	20	0	20	33	0	33
7:00 AM - 8:00 AM	50	1	51	20	2	22	51	1	52	121	4	125
8:00 AM - 9:00 AM	29	1	30	12	0	12	21	1	22	62	2	64
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	100	0	100	58	0	58	67	0	67	225	0	225
5:00 PM - 6:00 PM	198	0	198	94	0	94	109	0	109	401	0	401
6:00 PM - 7:00 PM	84	0	84	34	0	34	67	0	67	185	0	185
PASSENGER	469			223			335			1027		
	99.6%			99.1%			99.4%			99.4%		
TRUCK	2			2			2			6		
	0.4%			0.9%			0.6%			0.6%		
BOTH	471			225			337			1033		
	45.6%			21.8%			32.6%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	1	0	1	4	0	4	2	0	2	7	0	7
7:00 AM - 8:00 AM	1	0	1	5	0	5	3	0	3	9	0	9
8:00 AM - 9:00 AM	3	0	3	4	0	4	0	0	0	7	0	7
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	21	0	21	38	0	38	11	0	11	70	0	70
5:00 PM - 6:00 PM	51	0	51	50	0	50	28	0	28	129	0	129
6:00 PM - 7:00 PM	22	0	22	27	0	27	10	0	10	59	0	59
PASSENGER	99			128			54			281		
	100.0%			100.0%			100.0%			100.0%		
TRUCK	0			0			0			0		
	0.0%			0.0%			0.0%			0.0%		
BOTH	99			128			54			281		
	35.2%			45.6%			19.2%			100.0%		

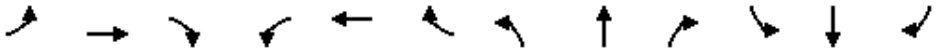
DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	1	0	1	42	4	46	31	1	32	74	5	79
7:00 AM - 8:00 AM	8	0	8	134	9	143	65	2	67	207	11	218
8:00 AM - 9:00 AM	7	0	7	83	8	91	47	0	47	137	8	145
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	33	0	33	197	1	198	128	0	128	358	1	359
5:00 PM - 6:00 PM	49	0	49	374	5	379	275	0	275	698	5	703
6:00 PM - 7:00 PM	32	0	32	163	1	164	89	0	89	284	1	285
PASSENGER	130			993			635			1758		
	100.0%			97.3%			99.5%			98.3%		
TRUCK	0			28			3			31		
	0.0%			2.7%			0.5%			1.7%		
BOTH	130			1021			638			1789		
	7.3%			57.1%			35.7%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	26	0	26	63	1	64	0	0	0	89	1	90
7:00 AM - 8:00 AM	69	1	70	194	9	203	1	0	1	264	10	274
8:00 AM - 9:00 AM	51	0	51	83	7	90	2	0	2	136	7	143
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	88	1	89	166	2	168	11	0	11	265	3	268
5:00 PM - 6:00 PM	132	0	132	340	2	342	9	0	9	481	2	483
6:00 PM - 7:00 PM	63	0	63	131	1	132	8	0	8	202	1	203
PASSENGER	429			977			31			1437		
	99.5%			97.8%			100.0%			98.4%		
TRUCK	2			22			0			24		
	0.5%			2.2%			0.0%			1.6%		
BOTH	431			999			31			1461		
	29.5%			68.4%			2.1%			100.0%		

Release 11-18-04



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	310	110	100	290	5	80	30	70	5	10	5
Future Volume (veh/h)	20	310	110	100	290	5	80	30	70	5	10	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1811	1811	1811	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	22	337	120	109	315	5	87	33	76	5	11	5
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
Percent Heavy Veh, %	5	5	5	6	6	6	4	4	4	4	4	4
Cap, veh/h	47	489	415	148	592	502	133	80	185	12	111	51
Arrive On Green	0.03	0.27	0.27	0.09	0.33	0.33	0.08	0.16	0.16	0.01	0.09	0.09
Sat Flow, veh/h	1739	1826	1547	1725	1811	1535	1753	495	1140	1753	1198	545
Grp Volume(v), veh/h	22	337	120	109	315	5	87	0	109	5	0	16
Grp Sat Flow(s),veh/h/ln	1739	1826	1547	1725	1811	1535	1753	0	1635	1753	0	1743
Q Serve(g_s), s	0.5	6.9	2.6	2.6	5.9	0.1	2.0	0.0	2.5	0.1	0.0	0.4
Cycle Q Clear(g_c), s	0.5	6.9	2.6	2.6	5.9	0.1	2.0	0.0	2.5	0.1	0.0	0.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.70	1.00		0.31
Lane Grp Cap(c), veh/h	47	489	415	148	592	502	133	0	265	12	0	162
V/C Ratio(X)	0.47	0.69	0.29	0.74	0.53	0.01	0.65	0.00	0.41	0.42	0.00	0.10
Avail Cap(c_a), veh/h	207	1176	997	494	1469	1245	418	0	1015	209	0	873
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.1	13.8	12.2	18.7	11.5	9.5	18.8	0.0	15.8	20.7	0.0	17.4
Incr Delay (d2), s/veh	7.1	1.7	0.4	7.0	0.7	0.0	5.3	0.0	1.0	22.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	2.6	0.8	1.2	2.0	0.0	0.9	0.0	0.9	0.1	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.2	15.5	12.6	25.6	12.2	9.5	24.1	0.0	16.8	42.9	0.0	17.7
LnGrp LOS	C	B	B	C	B	A	C	A	B	D	A	B
Approach Vol, veh/h		479			429			196			21	
Approach Delay, s/veh		15.3			15.6			20.0			23.7	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	11.8	8.6	16.2	8.2	8.9	6.1	18.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	26.0	12.0	27.0	10.0	21.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	2.1	4.5	4.6	8.9	4.0	2.4	2.5	7.9
Green Ext Time (p_c), s	0.0	0.5	0.1	2.3	0.1	0.0	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay	16.4
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	570	330	190	590	20	250	140	140	60	90	30
Future Volume (veh/h)	80	570	330	190	590	20	250	140	140	60	90	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	87	620	359	207	641	22	272	152	152	65	98	33
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	111	666	565	225	785	665	292	187	187	85	136	46
Arrive On Green	0.06	0.36	0.36	0.13	0.42	0.42	0.16	0.22	0.22	0.05	0.10	0.10
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	858	858	1781	1339	451
Grp Volume(v), veh/h	87	620	359	207	641	22	272	0	304	65	0	131
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	0	1716	1781	0	1789
Q Serve(g_s), s	3.8	25.3	14.9	9.1	24.0	0.6	12.0	0.0	13.4	2.9	0.0	5.6
Cycle Q Clear(g_c), s	3.8	25.3	14.9	9.1	24.0	0.6	12.0	0.0	13.4	2.9	0.0	5.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.50	1.00		0.25
Lane Grp Cap(c), veh/h	111	666	565	225	785	665	292	0	373	85	0	182
V/C Ratio(X)	0.78	0.93	0.64	0.92	0.82	0.03	0.93	0.00	0.81	0.76	0.00	0.72
Avail Cap(c_a), veh/h	112	684	580	225	802	680	292	0	541	135	0	406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.6	24.6	21.2	34.3	20.3	13.5	32.7	0.0	29.5	37.3	0.0	34.5
Incr Delay (d2), s/veh	28.8	19.1	2.2	39.2	6.5	0.0	35.0	0.0	6.2	12.9	0.0	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	14.0	5.6	6.3	11.1	0.2	7.8	0.0	5.9	1.5	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.4	43.7	23.5	73.4	26.8	13.6	67.8	0.0	35.7	50.2	0.0	39.9
LnGrp LOS	E	D	C	E	C	B	E	A	D	D	A	D
Approach Vol, veh/h		1066			870			576			196	
Approach Delay, s/veh		38.7			37.5			50.8			43.3	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	22.2	15.0	33.3	18.0	13.1	10.0	38.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.3	25.0	10.0	29.0	13.0	18.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	14.9	15.4	11.1	27.3	14.0	7.6	5.8	26.0
Green Ext Time (p_c), s	0.0	1.3	0.0	0.9	0.0	0.4	0.0	2.7

Intersection Summary	
HCM 6th Ctrl Delay	41.2
HCM 6th LOS	D

LANE SUMMARY

Site: 101 [Pleasant Street & Clover Road - AM]

Network: N101 [Plesant Street AM Peak - S2A]

New Site
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: Clover Road															
Lane 1[d]	196	3.0	196	3.0	1002	0.195	100	5.4	LOS A	0.8	19.6	Full	1600	0.0	0.0
Approach	196	3.0	196	3.0		0.195		5.4	LOS A	0.8	19.6				
East: Pleasant Street															
Lane 1	215	3.0	215	3.0	1208	0.178	100	4.5	LOS A	0.8	19.8	Full	616	0.0	0.0
Lane 2[d]	215	3.0	215	3.0	1208	0.178	100	4.5	LOS A	0.8	19.8	Full	616	0.0	0.0
Approach	429	3.0	429	3.0		0.178		4.5	LOS A	0.8	19.8				
North: Clover Road															
Lane 1[d]	22	3.0	22	3.0	881	0.025	100	4.3	LOS A	0.1	2.1	Full	1600	0.0	0.0
Approach	22	3.0	22	3.0		0.025		4.3	LOS A	0.1	2.1				
West: Pleasant Street															
Lane 1	239	3.0	239	3.0	1226	0.195	100	4.6	LOS A	0.9	22.2	Full	830	0.0	0.0
Lane 2[d]	239	3.0	239	3.0	1226	0.195	100	4.6	LOS A	0.9	22.2	Full	830	0.0	0.0
Approach	478	3.0	478	3.0		0.195		4.6	LOS A	0.9	22.2				
Intersection	1125	3.0	1125	3.0		0.195		4.7	LOS A	0.9	22.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %
Number of Iterations: 5 (maximum specified: 10)

d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:07:44 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Final Scenario\Roundaboout Alternative AM Peak - S2A.sip7

LANE SUMMARY

Site: 101 [Pleasant Street & Clover Road - PM]

Network: N101 [Plesant Street PM Peak - S2A]

New Site
Roundabout

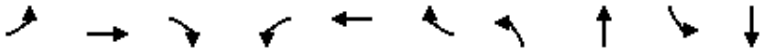
Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: Clover Road															
Lane 1[d]	576	3.0	576	3.0	701	0.821	100	28.3	LOS C	7.5	191.2	Full	1600	0.0	0.0
Approach	576	3.0	576	3.0		0.821		28.3	LOS C	7.5	191.2				
East: Pleasant Street															
Lane 1[d]	442	1.4	442	1.4	868	0.509	100	10.9	LOS B	3.0	76.7	Full	620	0.0	0.0
Lane 2	428	4.6	428	4.6	841	0.509	100	11.2	LOS B	2.9	75.2	Full	620	0.0	0.0
Approach	870	3.0	870	3.0		0.509		11.0	LOS B	3.0	76.7				
North: Clover Road															
Lane 1[d]	196	3.0	196	3.0	517	0.378	100	13.0	LOS B	1.5	38.3	Full	1600	0.0	0.0
Approach	196	3.0	196	3.0		0.378		13.0	LOS B	1.5	38.3				
West: Pleasant Street															
Lane 1	533	3.0	533	3.0	975	0.546	100	10.8	LOS B	3.6	90.9	Full	821	0.0	0.0
Lane 2[d]	533	3.0	533	3.0	975	0.546	100	10.8	LOS B	3.6	90.9	Full	821	0.0	0.0
Approach	1065	3.0	1065	3.0		0.546		10.8	LOS B	3.6	90.9				
Intersection	2707	3.0	2707	3.0		0.821		14.8	LOS B	7.5	191.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %
Number of Iterations: 5 (maximum specified: 10)

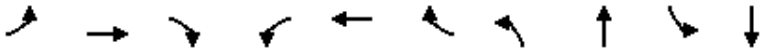
d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:53:17 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Final Scenario\Roundaboout Alternative PM Peak - S2A.sip7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	22	337	120	109	315	5	87	109	5	16
v/c Ratio	0.05	0.48	0.17	0.25	0.30	0.01	0.21	0.24	0.01	0.04
Control Delay	27.6	17.7	0.8	23.4	8.4	0.0	24.1	12.0	27.8	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	17.7	0.8	23.4	8.4	0.0	24.1	12.0	27.8	22.5
Queue Length 50th (ft)	5	74	0	25	32	0	20	7	1	3
Queue Length 95th (ft)	32	203	4	93	158	0	80	55	12	22
Internal Link Dist (ft)		741			536			229		538
Turn Bay Length (ft)	100		100	100		100				
Base Capacity (vph)	480	1137	1043	665	1325	1164	622	1031	485	930
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
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	0.05	0.30	0.12	0.16	0.24	0.00	0.14	0.11	0.01	0.02

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	87	620	359	207	641	22	272	304	65	131
v/c Ratio	0.82	0.96	0.52	0.98	0.84	0.03	0.99	0.65	0.52	0.51
Control Delay	92.1	55.4	12.7	96.4	35.6	0.1	89.8	30.9	54.6	35.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.1	55.4	12.7	96.4	35.6	0.1	89.8	30.9	54.6	35.8
Queue Length 50th (ft)	46	308	56	109	289	0	142	121	33	56
Queue Length 95th (ft)	#140	#587	152	#266	#552	0	#325	207	#90	108
Internal Link Dist (ft)		741			536			229		538
Turn Bay Length (ft)	100		100	100		100				
Base Capacity (vph)	106	648	685	212	760	768	276	555	127	400
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
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	0.82	0.96	0.52	0.98	0.84	0.03	0.99	0.55	0.51	0.33

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

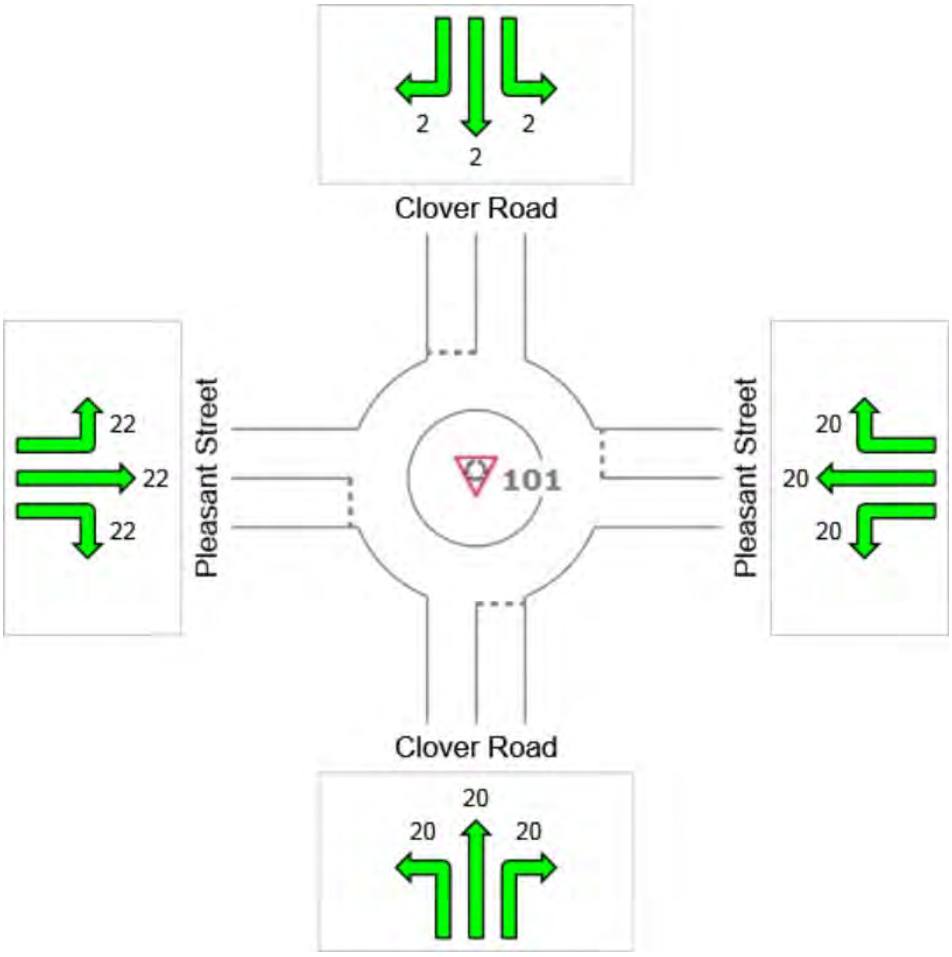
Site: 101 [Pleasant Street & Clover Road - AM]

Network: N101 [Plesant Street AM Peak - S2A]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Vehicle Queue (%ile)	20	20	2	22	22



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

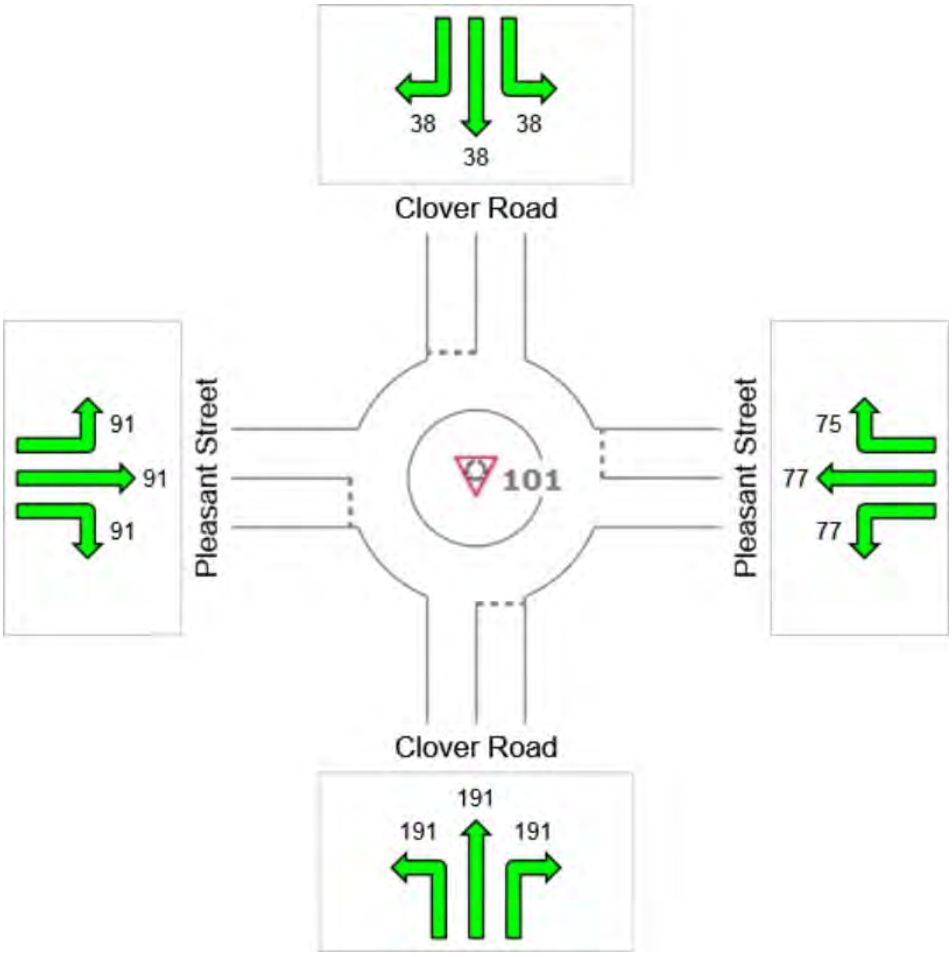
Site: 101 [Pleasant Street & Clover Road - PM]

Network: N101 [Plesant Street PM Peak - S2A]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Vehicle Queue (%ile)	191	77	38	91	191



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

PLEASANT STREET & 19TH STREET

TRAFFIC VOLUME COUNTS
CAPACITY ANALYSIS
QUEUE LENGTH ANALYSIS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT :	City of Noblesville
INTERSECTION :	Pleasant Street & 19th Street
DATE :	9/13/2017
COUNTED BY :	Miovision

	TOTAL VEHICLES (PASSENGER CARS + TRUCKS)											
	AM PEAK HOUR VOLUMES BEGINS 7:30 AM				OFF PEAK HOUR VOLUMES BEGINS				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
SOUTHBOUND	26		47	**73**					80		44	**124**
EASTBOUND	42	224		**266**					112	602		**714**
WESTBOUND		211	76	**287**						466	199	**665**

	PEAK HOUR FACTOR					
	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
SOUTHBOUND	0.68				0.86	
EASTBOUND	0.83	0.87			0.95	0.94
WESTBOUND	0.85				0.93	

	TRUCK PERCENTAGE											
	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
SOUTHBOUND	7.7%		10.6%	9.6%					1.3%		0.0%	0.8%
EASTBOUND	0.0%	6.3%		5.3%					0.9%	0.5%		0.6%
WESTBOUND		5.2%	0.0%	3.8%						0.6%	0.0%	0.5%

HOURLY SUMMARY									
HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM		34	34	65	75	140	174
7:00 AM	TO	8:00 AM		75	75	251	272	523	598
8:00 AM	TO	9:00 AM		31	31	148	131	279	310
4:00 PM	TO	5:00 PM		60	60	347	309	656	716
5:00 PM	TO	6:00 PM		110	110	701	650	1351	1461
6:00 PM	TO	7:00 PM		52	52	261	246	507	559
TOTAL VOLUME				362	362	1773	1683	3456	3818
PERCENTAGE				9.5%	9.5%	46.4%	44.1%	90.5%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & 19th Street
DATE : 9/13/2017

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	17	3	20				14	0	14	31	3	34
7:00 AM - 8:00 AM	24	2	26				46	3	49	70	5	75
8:00 AM - 9:00 AM	14	0	14				15	2	17	29	2	31
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	37	0	37				23	0	23	60	0	60
5:00 PM - 6:00 PM	66	1	67				43	0	43	109	1	110
6:00 PM - 7:00 PM	37	0	37				13	2	15	50	2	52
PASSENGER	195 97.0%						154 95.7%			349 96.4%		
TRUCK	6 3.0%						7 4.3%			13 3.6%		
BOTH	201 55.5%						161 44.5%			362 100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	12	1	13	50	2	52				62	3	65
7:00 AM - 8:00 AM	80	1	81	161	9	170				241	10	251
8:00 AM - 9:00 AM	18	0	18	123	7	130				141	7	148
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	52	0	52	294	1	295				346	1	347
5:00 PM - 6:00 PM	113	3	116	580	5	585				693	8	701
6:00 PM - 7:00 PM	31	1	32	229	0	229				260	1	261
PASSENGER	306 98.1%			1437 98.4%						1743 98.3%		
TRUCK	6 1.9%			24 1.6%						30 1.7%		
BOTH	312 17.6%			1461 82.4%						1773 100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM				59	0	59	16	0	16	75	0	75
7:00 AM - 8:00 AM				193	10	203	67	2	69	260	12	272
8:00 AM - 9:00 AM				90	8	98	33	0	33	123	8	131
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM				209	2	211	98	0	98	307	2	309
5:00 PM - 6:00 PM				480	2	482	168	0	168	648	2	650
6:00 PM - 7:00 PM				191	1	192	53	1	54	244	2	246
PASSENGER				1222 98.2%			435 99.3%			1657 98.5%		
TRUCK				23 1.8%			3 0.7%			26 1.5%		
BOTH				1245 74.0%			438 26.0%			1683 100.0%		

Release 11-18-04

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	350	300	100	50	90
Future Vol, veh/h	50	350	300	100	50	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	0	0	100
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	6	6	4	4
Mvmt Flow	54	380	326	109	54	98

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	435	0	-	0	814	326
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	488	-
Critical Hdwy	4.15	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.245	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1109	-	-	-	345	711
Stage 1	-	-	-	-	727	-
Stage 2	-	-	-	-	613	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1109	-	-	-	328	711
Mov Cap-2 Maneuver	-	-	-	-	428	-
Stage 1	-	-	-	-	691	-
Stage 2	-	-	-	-	613	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	12.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1109	-	-	-	428	711
HCM Lane V/C Ratio	0.049	-	-	-	0.127	0.138
HCM Control Delay (s)	8.4	-	-	-	14.6	10.9
HCM Lane LOS	A	-	-	-	B	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4	0.5

Intersection	
Int Delay, s/veh	11.8

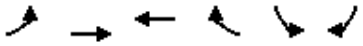
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	140	810	780	210	110	60
Future Vol, veh/h	140	810	780	210	110	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	0	0	100
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	152	880	848	228	120	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1076	0	-	0	2032	848
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	1184	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	648	-	-	-	~ 63	361
Stage 1	-	-	-	-	420	-
Stage 2	-	-	-	-	290	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	648	-	-	-	~ 48	361
Mov Cap-2 Maneuver	-	-	-	-	~ 106	-
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	290	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	136.9
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	648	-	-	-	106	361
HCM Lane V/C Ratio	0.235	-	-	-	1.128	0.181
HCM Control Delay (s)	12.3	-	-	-	202.2	17.2
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.9	-	-	-	7.6	0.7

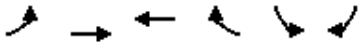
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	50	350	300	100	50	90
Future Volume (veh/h)	50	350	300	100	50	90
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1826	1826	1811	1811	1841	1841
Adj Flow Rate, veh/h	54	380	326	109	54	98
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	6	6	4	4
Cap, veh/h	491	974	544	461	213	190
Arrive On Green	0.06	0.53	0.30	0.30	0.12	0.12
Sat Flow, veh/h	1739	1826	1811	1535	1753	1560
Grp Volume(v), veh/h	54	380	326	109	54	98
Grp Sat Flow(s),veh/h/ln	1739	1826	1811	1535	1753	1560
Q Serve(g_s), s	0.5	3.6	4.5	1.6	0.8	1.7
Cycle Q Clear(g_c), s	0.5	3.6	4.5	1.6	0.8	1.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	491	974	544	461	213	190
V/C Ratio(X)	0.11	0.39	0.60	0.24	0.25	0.52
Avail Cap(c_a), veh/h	745	2392	1686	1429	1330	1183
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.6	4.0	8.7	7.6	11.5	11.9
Incr Delay (d2), s/veh	0.1	0.3	1.1	0.3	0.6	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.5	1.2	0.0	0.3	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.7	4.2	9.7	7.9	12.2	14.1
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		434	435		152	
Approach Delay, s/veh		4.4	9.3		13.4	
Approach LOS		A	A		B	

Timer - Assigned Phs		4		6	7	8
Phs Duration (G+Y+Rc), s		20.5		8.5	6.8	13.7
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		38.0		22.0	6.0	27.0
Max Q Clear Time (g_c+I1), s		5.6		3.7	2.5	6.5
Green Ext Time (p_c), s		2.5		0.4	0.0	2.3

Intersection Summary	
HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	140	810	780	210	110	60
Future Volume (veh/h)	140	810	780	210	110	60
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	152	880	848	228	120	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	376	1317	1014	859	184	164
Arrive On Green	0.09	0.70	0.54	0.54	0.10	0.10
Sat Flow, veh/h	1781	1870	1870	1585	1781	1585
Grp Volume(v), veh/h	152	880	848	228	120	65
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1585	1781	1585
Q Serve(g_s), s	1.6	13.7	19.8	4.0	3.4	2.0
Cycle Q Clear(g_c), s	1.6	13.7	19.8	4.0	3.4	2.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	376	1317	1014	859	184	164
V/C Ratio(X)	0.40	0.67	0.84	0.27	0.65	0.40
Avail Cap(c_a), veh/h	429	1691	1331	1128	617	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.6	4.3	10.0	6.4	22.4	21.8
Incr Delay (d2), s/veh	0.7	0.7	3.7	0.2	3.9	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	2.5	6.8	1.0	1.5	1.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.3	5.0	13.7	6.5	26.3	23.4
LnGrp LOS	B	A	B	A	C	C
Approach Vol, veh/h		1032	1076		185	
Approach Delay, s/veh		5.8	12.2		25.3	
Approach LOS		A	B		C	

Timer - Assigned Phs		4		6	7	8
Phs Duration (G+Y+Rc), s		41.6		10.4	8.4	33.2
Change Period (Y+Rc), s		5.0		5.0	4.0	5.0
Max Green Setting (Gmax), s		47.0		18.0	6.0	37.0
Max Q Clear Time (g_c+I1), s		15.7		5.4	3.6	21.8
Green Ext Time (p_c), s		8.1		0.4	0.1	6.4

Intersection Summary	
HCM 6th Ctrl Delay	10.3
HCM 6th LOS	B

LANE SUMMARY

Site: 101 [Pleasant Street & 19th Street - AM]

Network: N101 [Plesant Street AM Peak - S2A]

New Site
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
East: Pleasant Street															
Lane 1[d]	254	3.0	254	3.0	1321	0.193	100	4.3	LOS A	0.7	19.0	Full	830	0.0	0.0
Lane 2	180	3.0	180	3.0	1321	0.137	71[6]	3.8	LOS A	0.5	12.7	Full	830	0.0	0.0
Approach	435	3.0	435	3.0		0.193		4.1	LOS A	0.7	19.0				
North: 19th Street															
Lane 1[d]	152	3.0	152	3.0	1036	0.147	100	4.8	LOS A	0.6	14.3	Full	1600	0.0	0.0
Approach	152	3.0	152	3.0		0.147		4.8	LOS A	0.6	14.3				
West: Pleasant Street															
Lane 1	217	3.0	217	3.0	1310	0.166	100	4.1	LOS A	0.7	18.7	Short	350	0.0	NA
Lane 2[d]	217	3.0	217	3.0	1310	0.166	100	4.1	LOS A	0.7	18.7	Full	1100	0.0	0.0
Approach	435	3.0	435	3.0		0.166		4.1	LOS A	0.7	18.7				
Intersection	1022	3.0	1022	3.0		0.193		4.2	LOS A	0.7	19.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %
Number of Iterations: 5 (maximum specified: 10)

6 Lane under-utilisation due to downstream effects
d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:07:44 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Final Scenario\Roundaboout Alternative AM Peak - S2A.sip7

LANE SUMMARY

Site: 101 [Pleasant Street & 19th Street - PM]

Network: N101 [Plesant Street PM Peak - S2A]

New Site
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
East: Pleasant Street															
Lane 1[d]	630	3.0	630	3.0	1210	0.520	100	8.8	LOS A	3.2	80.9	Full	821	0.0	0.0
Lane 2	447	3.0	447	3.0	1210	0.369	71[6]	6.5	LOS A	1.8	46.6	Full	821	0.0	0.0
Approach	1076	3.0	1076	3.0		0.520		7.8	LOS A	3.2	80.9				
North: 19th Street															
Lane 1[d]	185	3.0	185	3.0	656	0.282	100	9.0	LOS A	1.0	26.7	Full	1600	0.0	0.0
Approach	185	3.0	185	3.0		0.282		9.0	LOS A	1.0	26.7				
West: Pleasant Street															
Lane 1	516	3.0	516	3.0	1232	0.419	100	7.1	LOS A	2.4	62.2	Short	350	0.0	NA
Lane 2[d]	516	3.0	516	3.0	1232	0.419	100	7.1	LOS A	2.4	62.2	Full	1100	0.0	0.0
Approach	1033	3.0	1033	3.0		0.419		7.1	LOS A	2.4	62.2				
Intersection	2293	3.0	2293	3.0		0.520		7.6	LOS A	3.2	80.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %
Number of Iterations: 5 (maximum specified: 10)

6 Lane under-utilisation due to downstream effects
d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:53:17 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Final Scenario\Roundaboout Alternative PM Peak - S2A.sip7

LANE SUMMARY

Site: 101 [Pleasant Street & 19th Street - AM - Import]

Network: N101 [Plesant]

New Site
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
East: Pleasant Street															
Lane 1[d]	435	3.0	435	3.0	1265	0.344	100	6.0	LOS A	2.0	51.9	Full	830	0.0	0.0
Approach	435	3.0	435	3.0		0.344		6.0	LOS A	2.0	51.9				
North: 19th Street															
Lane 1[d]	152	3.0	152	3.0	951	0.160	100	5.3	LOS A	0.7	17.8	Full	1600	0.0	0.0
Approach	152	3.0	152	3.0		0.160		5.3	LOS A	0.7	17.8				
West: Pleasant Street															
Lane 1[d]	435	3.0	435	3.0	1265	0.344	100	6.0	LOS A	2.0	51.9	Full	1100	0.0	0.0
Approach	435	3.0	435	3.0		0.344		6.0	LOS A	2.0	51.9				
Intersection	1022	3.0	1022	3.0		0.344		5.9	LOS A	2.0	51.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Wednesday, October 11, 2017 11:25:20 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Roundabout Alternative - S2B\Roundaboout Alternative AM Peak - S2B.sip7

LANE SUMMARY

Site: 101 [Pleasant Street & 19th Street - PM - Import]

Network: N101 [Plesant Street PM Peak - S2B]

New Site
Roundabout

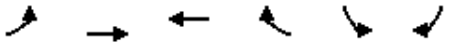
Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
East: Pleasant Street															
Lane 1[d]	1076	3.0	1019	3.0	1155	0.883	100	25.1	LOS C	18.0	459.8	Full	821	0.0	0.0
Approach	1076	3.0	1019[N1]	3.0		0.883		25.1	LOS C	18.0	459.8				
North: 19th Street															
Lane 1[d]	185	3.0	185	3.0	490	0.377	100	13.6	LOS B	1.4	36.5	Full	1600	-15.0[N3]	0.0
Approach	185	3.0	185	3.0		0.377		13.6	LOS B	1.4	36.5				
West: Pleasant Street															
Lane 1[d]	1033	3.0	1033	3.0	958	1.077	100	72.3	LOS F	61.1	1563.5	Full	1100	-18.9[N3]	16.6
Approach	1033	3.0	1033	3.0		1.077		72.3	LOS E	61.1	1563.5				
Intersection	2293	3.0	2237[N1]	3.1		1.077		45.9	LOS D	61.1	1563.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.3 %
Number of Iterations: 10 (maximum specified: 10)

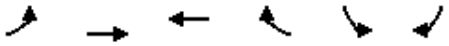
d Dominant lane on roundabout approach
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

Organisation: A&F ENGINEERING CO., LLC | Processed: Wednesday, October 11, 2017 12:06:47 PM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Roundabout Alternative - S2B\Roundaboout Alternative PM Peak - S2B.sip7



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	54	380	326	109	54	98
v/c Ratio	0.08	0.32	0.32	0.12	0.10	0.18
Control Delay	4.0	4.8	9.2	3.2	15.1	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.0	4.8	9.2	3.2	15.1	6.1
Queue Length 50th (ft)	4	32	26	0	6	0
Queue Length 95th (ft)	14	79	123	22	37	30
Internal Link Dist (ft)		1026	741		712	
Turn Bay Length (ft)	100					100
Base Capacity (vph)	710	1674	1479	1277	1295	1184
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.23	0.22	0.09	0.04	0.08

Intersection Summary



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	152	880	848	228	120	65
v/c Ratio	0.39	0.63	0.72	0.21	0.39	0.20
Control Delay	6.5	8.5	17.5	2.0	29.5	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	8.5	17.5	2.0	29.5	8.9
Queue Length 50th (ft)	15	160	257	0	46	0
Queue Length 95th (ft)	37	337	#542	29	90	30
Internal Link Dist (ft)		1026	741		712	
Turn Bay Length (ft)	100					100
Base Capacity (vph)	385	1415	1193	1096	635	609
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.62	0.71	0.21	0.19	0.11

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

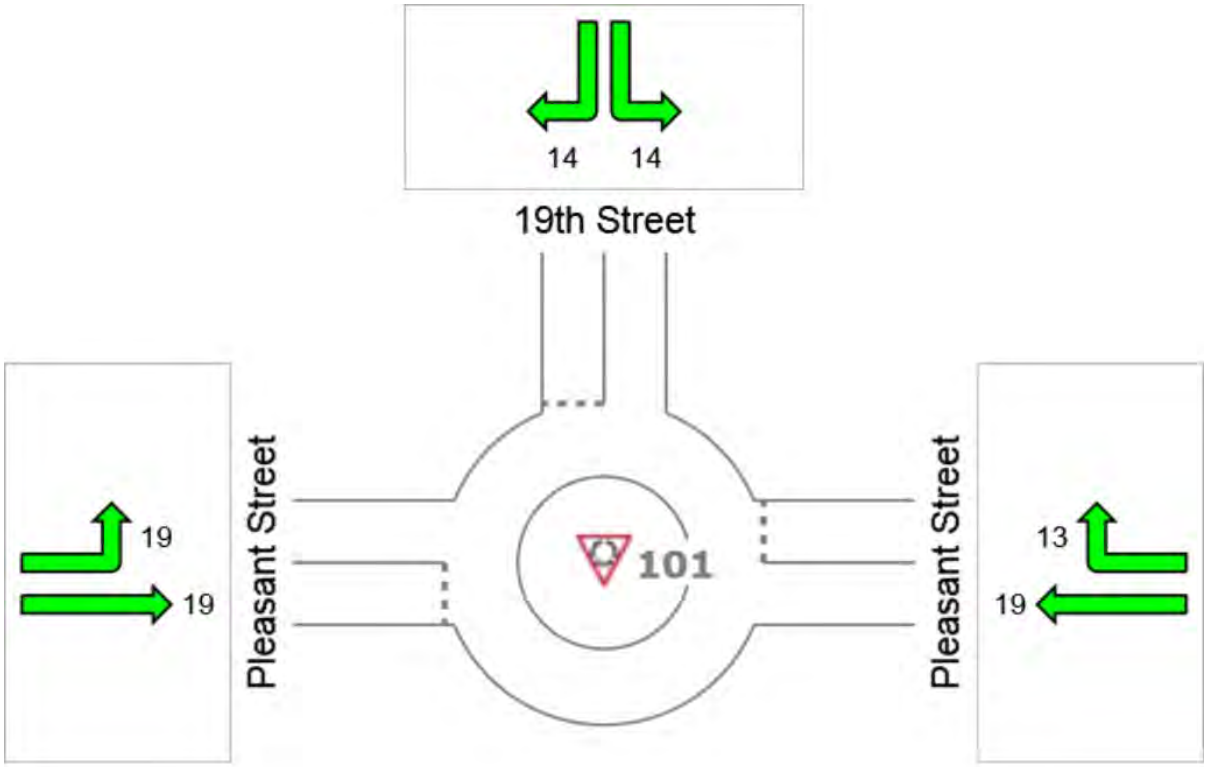
Site: 101 [Pleasant Street & 19th Street - AM]

Network: N101 [Plesant Street AM Peak - S2A]

New Site
Roundabout

All Movement Classes

	East	North	West	Intersection
Vehicle Queue (%ile)	19	14	19	19



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:07:44 AM

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

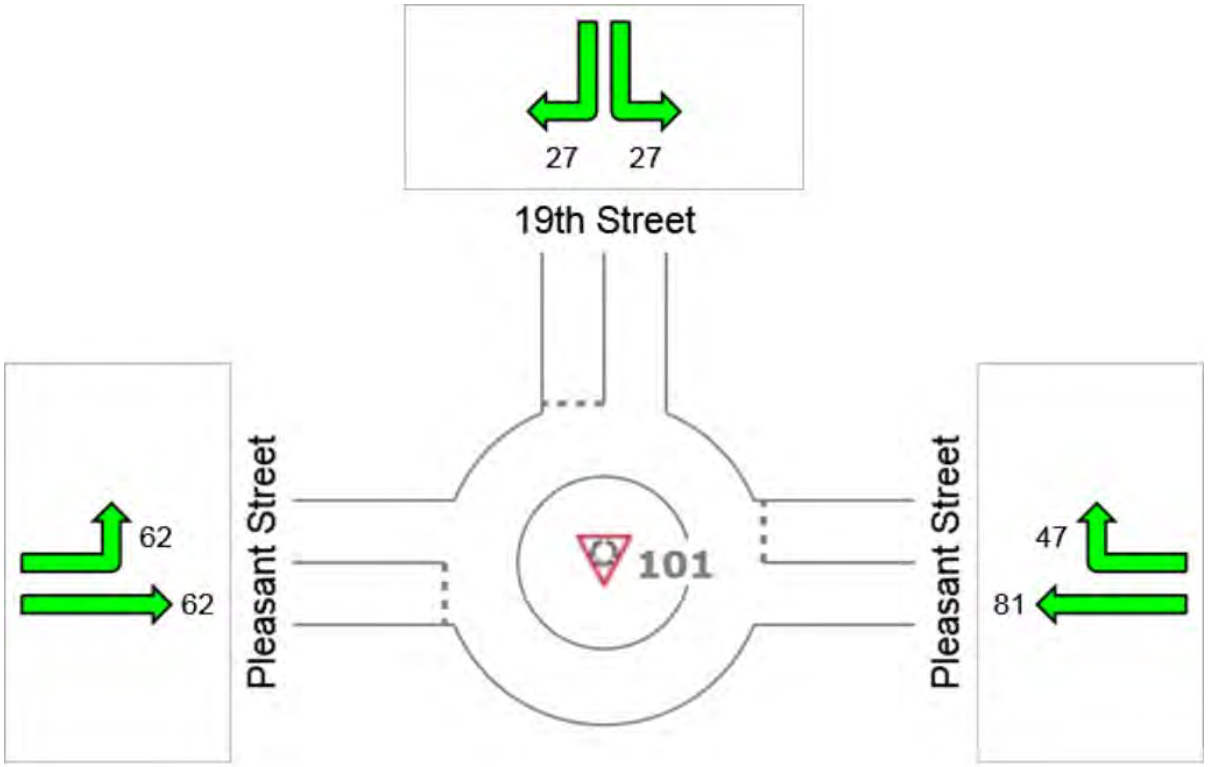
Site: 101 [Pleasant Street & 19th Street - PM]

Network: N101 [Plesant Street PM Peak - S2A]

New Site
Roundabout

All Movement Classes

	East	North	West	Intersection
Vehicle Queue (%ile)	81	27	62	81



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:53:17 AM

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

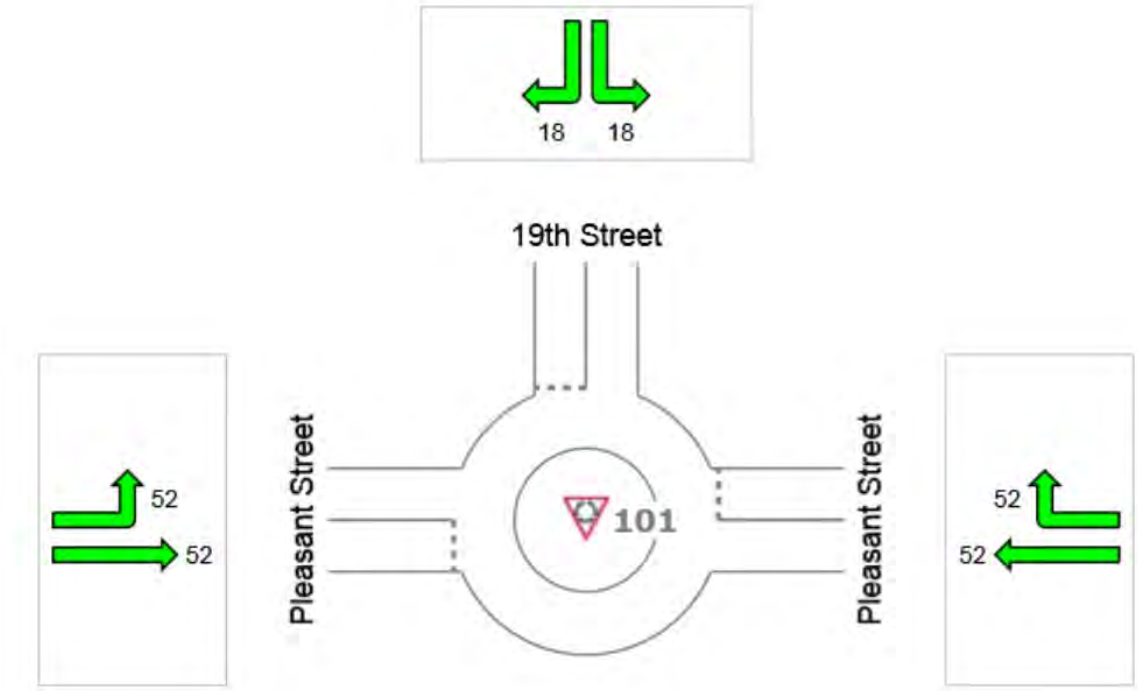
Network: N101 [Plesant]

Site: 101 [Pleasant Street & 19th Street - AM - Import]

New Site
Roundabout

All Movement Classes

	East	North	West	Intersection
Vehicle Queue (%ile)	52	18	52	52



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

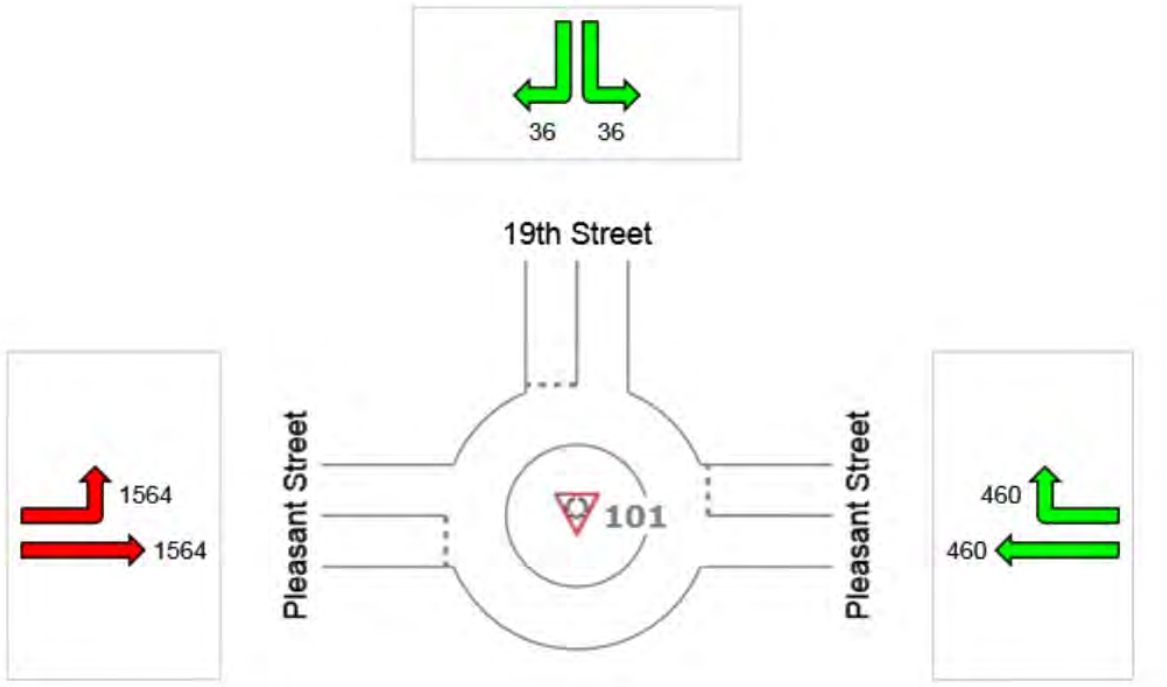
Site: 101 [Pleasant Street & 19th Street - PM - Import]

Network: N101 [Plesant Street PM Peak - S2B]

New Site
Roundabout

All Movement Classes

	East	North	West	Intersection
Vehicle Queue (%ile)	460	36	1564	1564



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

PLEASANT STREET & 16TH STREET

TRAFFIC VOLUME COUNTS
CAPACITY ANALYSIS
QUEUE LENGTH ANALYSIS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & 16th Street
DATE : 9/12/2017
COUNTED BY : Miovision

	TOTAL VEHICLES (PASSENGER CARS + TRUCKS)											
	AM PEAK HOUR VOLUMES BEGINS 7:15 AM				OFF PEAK HOUR VOLUMES BEGINS				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	12	0	41	**53**					33	0	67	**100**
SOUTHBOUND	0	2	0	**2**					1	1	0	**2**
EASTBOUND	1	202	16	**219**					0	531	20	**551**
WESTBOUND	44	220	2	**266**					65	389	0	**454**

	PEAK HOUR FACTOR					
	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.63	0.86			0.81	0.95
SOUTHBOUND	0.50				0.25	
EASTBOUND	0.90				0.93	
WESTBOUND	0.83				0.85	

	TRUCK PERCENTAGE											
	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	8.3%	0.0%	2.4%	3.8%					0.0%	0.0%	1.5%	1.0%
SOUTHBOUND	0.0%	100.0%	0.0%	100.0%					0.0%	0.0%	0.0%	0.0%
EASTBOUND	0.0%	4.0%	0.0%	3.7%					0.0%	0.8%	0.0%	0.7%
WESTBOUND	6.8%	5.9%	50.0%	6.4%					0.0%	0.8%	0.0%	0.7%

HOURLY SUMMARY								
HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	18	0	18	54	37	91	109
7:00 AM	TO	8:00 AM	68	1	69	205	244	449	518
8:00 AM	TO	9:00 AM	13	1	14	119	113	232	246
4:00 PM	TO	5:00 PM	59	0	59	273	210	483	542
5:00 PM	TO	6:00 PM	63	5	68	482	441	923	991
6:00 PM	TO	7:00 PM	23	0	23	214	188	402	425
TOTAL VOLUME			244	7	251	1347	1233	2580	2831
PERCENTAGE			8.6%	0.2%	8.9%	47.6%	43.6%	91.1%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & 16th Street
DATE : 9/12/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	3	0	3	0	0	0	14	1	15	17	1	18
7:00 AM - 8:00 AM	13	0	13	0	0	0	54	1	55	67	1	68
8:00 AM - 9:00 AM	2	2	4	1	0	1	5	3	8	8	5	13
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	15	0	15	0	0	0	43	1	44	58	1	59
5:00 PM - 6:00 PM	25	0	25	0	0	0	38	0	38	63	0	63
6:00 PM - 7:00 PM	6	0	6	1	0	1	16	0	16	23	0	23
PASSENGER	64			2			170			236		
	97.0%			100.0%			96.6%			96.7%		
TRUCK	2			0			6			8		
	3.0%			0.0%			3.4%			3.3%		
BOTH	66			2			176			244		
	27.0%			0.8%			72.1%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM - 8:00 AM	0	0	0	0	1	1	0	0	0	0	1	1
8:00 AM - 9:00 AM	0	0	0	0	1	1	0	0	0	0	1	1
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM - 6:00 PM	2	0	2	1	0	1	2	0	2	5	0	5
6:00 PM - 7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
PASSENGER	2			1			2			5		
	100.0%			33.3%			100.0%			71.4%		
TRUCK	0			2			0			2		
	0.0%			66.7%			0.0%			28.6%		
BOTH	2			3			2			7		
	28.6%			42.9%			28.6%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	0	0	0	47	2	49	5	0	5	52	2	54
7:00 AM - 8:00 AM	0	0	0	182	9	191	13	1	14	195	10	205
8:00 AM - 9:00 AM	1	0	1	108	3	111	7	0	7	116	3	119
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	0	0	0	258	2	260	13	0	13	271	2	273
5:00 PM - 6:00 PM	1	0	1	465	4	469	12	0	12	478	4	482
6:00 PM - 7:00 PM	3	0	3	201	1	202	9	0	9	213	1	214
PASSENGER	5			1261			59			1325		
	100.0%			98.4%			98.3%			98.4%		
TRUCK	0			21			1			22		
	0.0%			1.6%			1.7%			1.6%		
BOTH	5			1282			60			1347		
	0.4%			95.2%			4.5%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	1	0	1	36	0	36	0	0	0	37	0	37
7:00 AM - 8:00 AM	40	1	41	190	11	201	1	1	2	231	13	244
8:00 AM - 9:00 AM	13	4	17	90	6	96	0	0	0	103	10	113
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	23	0	23	186	1	187	0	0	0	209	1	210
5:00 PM - 6:00 PM	56	0	56	382	2	384	1	0	1	439	2	441
6:00 PM - 7:00 PM	12	0	12	173	0	173	3	0	3	188	0	188
PASSENGER	145			1057			5			1207		
	96.7%			98.1%			83.3%			97.9%		
TRUCK	5			20			1			26		
	3.3%			1.9%			16.7%			2.1%		
BOTH	150			1077			6			1233		
	12.2%			87.3%			0.5%			100.0%		

Release 11-18-04

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	330	20	60	330	5	20	5	50	5	5	5
Future Vol, veh/h	5	330	20	60	330	5	20	5	50	5	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	165	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	5	5	5	6	6	6	4	4	4	4	4	4
Mvmt Flow	6	388	24	71	388	6	24	6	59	6	6	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	394	0	0	412	0	0	951	948	400	978	957	391
Stage 1	-	-	-	-	-	-	412	412	-	533	533	-
Stage 2	-	-	-	-	-	-	539	536	-	445	424	-
Critical Hdwy	4.15	-	-	4.16	-	-	7.14	6.54	6.24	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.14	5.54	-
Follow-up Hdwy	2.245	-	-	2.254	-	-	3.536	4.036	3.336	3.536	4.036	3.336
Pot Cap-1 Maneuver	1148	-	-	1126	-	-	238	259	646	228	256	653
Stage 1	-	-	-	-	-	-	613	591	-	527	522	-
Stage 2	-	-	-	-	-	-	523	520	-	588	584	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1148	-	-	1126	-	-	221	241	646	194	239	653
Mov Cap-2 Maneuver	-	-	-	-	-	-	342	350	-	310	337	-
Stage 1	-	-	-	-	-	-	610	588	-	524	489	-
Stage 2	-	-	-	-	-	-	480	487	-	526	581	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.3	13.8	14.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	499	1148	-	-	1126	-	-	388
HCM Lane V/C Ratio	0.177	0.005	-	-	0.063	-	-	0.045
HCM Control Delay (s)	13.8	8.2	-	-	8.4	-	-	14.7
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.6	0	-	-	0.2	-	-	0.1

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	860	30	80	690	5	40	5	80	5	5	5
Future Vol, veh/h	5	860	30	80	690	5	40	5	80	5	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	165	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	1012	35	94	812	6	47	6	94	6	6	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	818	0	0	1047	0	0	2051	2048	1030	2095	2062	815
Stage 1	-	-	-	-	-	-	1042	1042	-	1003	1003	-
Stage 2	-	-	-	-	-	-	1009	1006	-	1092	1059	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	810	-	-	665	-	-	~ 41	56	283	38	55	377
Stage 1	-	-	-	-	-	-	277	307	-	292	320	-
Stage 2	-	-	-	-	-	-	290	319	-	260	301	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	810	-	-	665	-	-	~ 35	48	283	22	47	377
Mov Cap-2 Maneuver	-	-	-	-	-	-	131	152	-	60	128	-
Stage 1	-	-	-	-	-	-	275	305	-	290	275	-
Stage 2	-	-	-	-	-	-	240	274	-	169	299	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.2	60.2	43.5
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	201	810	-	-	665	-	-	111
HCM Lane V/C Ratio	0.732	0.007	-	-	0.142	-	-	0.159
HCM Control Delay (s)	60.2	9.5	-	-	11.3	-	-	43.5
HCM Lane LOS	F	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	4.8	0	-	-	0.5	-	-	0.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	330	20	60	330	5	20	5	50	5	5	5
Future Volume (veh/h)	5	330	20	60	330	5	20	5	50	5	5	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1811	1811	1811	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	6	388	24	71	388	6	24	6	59	6	6	6
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	5	5	5	6	6	6	4	4	4	4	4	4
Cap, veh/h	599	748	46	584	782	12	252	11	112	273	65	61
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	967	1702	105	943	1779	28	417	104	1026	517	596	556
Grp Volume(v), veh/h	6	0	412	71	0	394	89	0	0	18	0	0
Grp Sat Flow(s),veh/h/ln	967	0	1807	943	0	1806	1547	0	0	1669	0	0
Q Serve(g_s), s	0.1	0.0	3.7	1.3	0.0	3.5	1.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.6	0.0	3.7	5.0	0.0	3.5	1.2	0.0	0.0	0.2	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.02	0.27		0.66	0.33		0.33
Lane Grp Cap(c), veh/h	599	0	794	584	0	794	375	0	0	399	0	0
V/C Ratio(X)	0.01	0.00	0.52	0.12	0.00	0.50	0.24	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	1396	0	2285	1362	0	2284	1722	0	0	1763	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.7	0.0	4.5	6.3	0.0	4.4	9.3	0.0	0.0	8.9	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.5	0.1	0.0	0.5	0.3	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.4	0.1	0.0	0.4	0.3	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.7	0.0	5.0	6.4	0.0	4.9	9.6	0.0	0.0	8.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		418			465			89			18	
Approach Delay, s/veh		5.0			5.2			9.6			8.9	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	7.4	14.7	7.4	14.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	22.0	28.0	22.0	28.0
Max Q Clear Time (g_c+I1), s	3.2	5.7	2.2	7.0
Green Ext Time (p_c), s	0.4	2.6	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	5.6
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	860	30	80	690	5	40	5	80	5	5	5
Future Volume (veh/h)	5	860	30	80	690	5	40	5	80	5	5	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	1012	35	94	812	6	47	6	94	6	6	6
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	437	1255	43	294	1295	10	132	22	125	125	104	72
Arrive On Green	0.70	0.70	0.70	0.70	0.70	0.70	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	668	1797	62	539	1854	14	387	175	998	322	829	575
Grp Volume(v), veh/h	6	0	1047	94	0	818	147	0	0	18	0	0
Grp Sat Flow(s),veh/h/ln	668	0	1859	539	0	1868	1561	0	0	1726	0	0
Q Serve(g_s), s	0.3	0.0	22.0	8.3	0.0	13.3	3.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	13.6	0.0	22.0	30.3	0.0	13.3	5.1	0.0	0.0	0.5	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.01	0.32		0.64	0.33		0.33
Lane Grp Cap(c), veh/h	437	0	1298	294	0	1305	279	0	0	300	0	0
V/C Ratio(X)	0.01	0.00	0.81	0.32	0.00	0.63	0.53	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	584	0	1708	413	0	1716	575	0	0	599	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.2	0.0	5.9	16.3	0.0	4.6	23.9	0.0	0.0	21.9	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	2.2	0.6	0.0	0.5	1.5	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	5.2	1.0	0.0	2.9	1.9	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.2	0.0	8.1	17.0	0.0	5.1	25.4	0.0	0.0	22.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	C	A	A	C	A	A
Approach Vol, veh/h		1053			912			147			18	
Approach Delay, s/veh		8.1			6.3			25.4			22.0	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	12.1	44.5	12.1	44.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	18.0	52.0	18.0	52.0
Max Q Clear Time (g_c+I1), s	7.1	24.0	2.5	32.3
Green Ext Time (p_c), s	0.5	10.7	0.0	7.3

Intersection Summary	
HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

LANE SUMMARY

Site: 101 [Pleasant Street & 16th Street - AM - Import]

Network: N101 [Plesant]

New Site
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: 16th Street															
Lane 1[d]	82	3.0	82	3.0	909	0.090	100	4.8	LOS A	0.4	9.4	Full	1600	0.0	0.0
Approach	82	3.0	82	3.0		0.090		4.8	LOS A	0.4	9.4				
East: Pleasant Street															
Lane 1[d]	429	3.0	429	3.0	1295	0.332	100	5.8	LOS A	2.0	50.0	Full	1100	0.0	0.0
Approach	429	3.0	429	3.0		0.332		5.8	LOS A	2.0	50.0				
North: 16th Street															
Lane 1[d]	16	3.0	16	3.0	839	0.019	100	4.5	LOS A	0.1	1.9	Full	1600	0.0	0.0
Approach	16	3.0	16	3.0		0.019		4.5	LOS A	0.1	1.9				
West: Pleasant Street															
Lane 1[d]	386	3.0	386	3.0	1237	0.312	100	5.8	LOS A	1.7	44.7	Full	2200	0.0	0.0
Approach	386	3.0	386	3.0		0.312		5.8	LOS A	1.7	44.7				
Intersection	913	3.0	913	3.0		0.332		5.7	LOS A	2.0	50.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Wednesday, October 11, 2017 11:25:20 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Roundabout Alternative - S2B\Roundaboout Alternative AM Peak - S2B.sip7

LANE SUMMARY

Site: 101 [Pleasant Street & 16th Street - PM - Import]

Network: N101 [Plesant Street PM Peak - S2B]

New Site
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: 16th Street															
Lane 1[d]	136	3.0	136	3.0	445	0.305	100	13.1	LOS B	1.1	28.0	Full	1600	-10.3[N3]	0.0
Approach	136	3.0	136	3.0		0.305		13.1	LOS B	1.1	28.0				
East: Pleasant Street															
Lane 1[d]	842	3.0	801	3.0	1265	0.633	100	10.8	LOS B	6.1	156.2	Full	1100	0.0	0.0
Approach	842	3.0	801[N1]	3.0		0.633		10.8	LOS B	6.1	156.2				
North: 16th Street															
Lane 1[d]	16	3.0	16	3.0	523	0.031	100	7.3	LOS A	0.1	2.7	Full	1600	-5.6[N3]	0.0
Approach	16	3.0	16	3.0		0.031		7.3	LOS A	0.1	2.7				
West: Pleasant Street															
Lane 1[d]	973	3.0	973	3.0	1036	0.939	100	35.2	LOS D	12.6	322.6	Full	2200	-14.7[N3]	0.0
Approach	973	3.0	973	3.0		0.939		35.2	LOS D	12.6	322.6				
Intersection	1967	3.0	1926[N1]	3.1		0.939		23.3	LOS C	12.6	322.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 4.3 %
Number of Iterations: 10 (maximum specified: 10)

d Dominant lane on roundabout approach
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

Organisation: A&F ENGINEERING CO., LLC | Processed: Wednesday, October 11, 2017 12:06:47 PM
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Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	6	412	71	394	89	18
v/c Ratio	0.02	0.55	0.18	0.53	0.23	0.05
Control Delay	5.0	9.4	6.5	9.2	7.2	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	9.4	6.5	9.2	7.2	9.3
Queue Length 50th (ft)	0	36	5	35	3	1
Queue Length 95th (ft)	3	83	19	80	25	11
Internal Link Dist (ft)		1634		488	467	480
Turn Bay Length (ft)	150		150			
Base Capacity (vph)	891	1670	869	1665	1249	1255
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.25	0.08	0.24	0.07	0.01

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	6	1047	94	818	147	18
v/c Ratio	0.02	0.83	0.52	0.65	0.50	0.08
Control Delay	3.4	14.4	17.6	8.3	19.0	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.4	14.4	17.6	8.3	19.0	22.7
Queue Length 50th (ft)	1	198	12	121	20	4
Queue Length 95th (ft)	4	412	60	245	64	20
Internal Link Dist (ft)		1605		527	467	480
Turn Bay Length (ft)	150		150			
Base Capacity (vph)	416	1552	222	1559	551	529
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.67	0.42	0.52	0.27	0.03

Intersection Summary

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

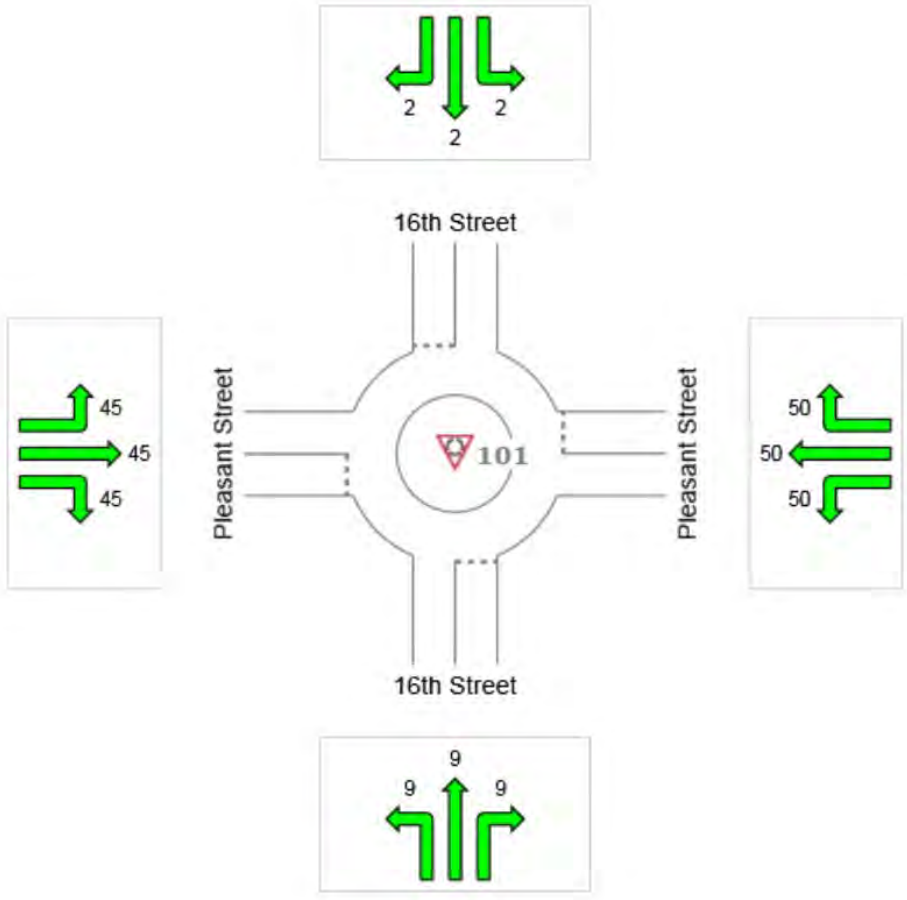
Network: N101 [Plesant]

Site: 101 [Pleasant Street & 16th Street - AM - Import]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Vehicle Queue (%ile)	9	50	2	45	50



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

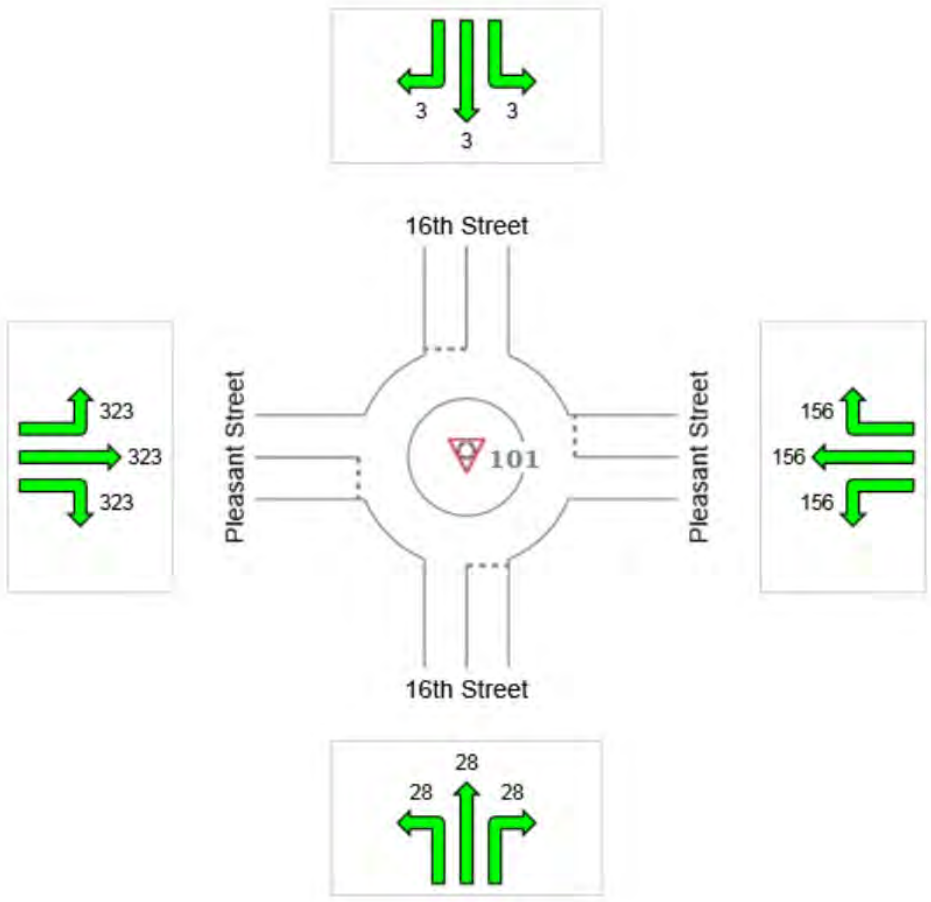
Site: 101 [Pleasant Street & 16th Street - PM - Import]

Network: N101 [Plesant Street PM Peak - S2B]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Vehicle Queue (%ile)	28	156	3	323	323



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

PLEASANT STREET & 10TH STREET

TRAFFIC VOLUME COUNTS
CAPACITY ANALYSIS
QUEUE LENGTH ANALYSIS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & 10th Street
DATE : 9/12/2017
COUNTED BY : Miovision

	TOTAL VEHICLES (PASSENGER CARS + TRUCKS)											
	AM PEAK HOUR VOLUMES BEGINS 7:30 AM				OFF PEAK HOUR VOLUMES BEGINS				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	3	225	28	**256**					7	375	87	**469**
SOUTHBOUND	38	233	3	**274**					67	300	13	**380**
EASTBOUND	0	161	22	**183**					0	352	35	**387**
WESTBOUND	3	133	40	**176**					2	241	135	**378**

	PEAK HOUR FACTOR					
	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.77	0.91			0.98	0.98
SOUTHBOUND	0.87				0.90	
EASTBOUND	0.86				0.93	
WESTBOUND	0.88				0.97	

	TRUCK PERCENTAGE											
	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	0.0%	2.2%	0.0%	2.0%					14.3%	0.3%	1.1%	0.6%
SOUTHBOUND	2.6%	2.6%	0.0%	2.6%					0.0%	1.3%	0.0%	1.1%
EASTBOUND	0.0%	4.3%	4.5%	4.4%					0.0%	0.9%	0.0%	0.8%
WESTBOUND	0.0%	7.5%	5.0%	6.8%					0.0%	1.7%	0.0%	1.1%

HOURLY SUMMARY								
HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	65	86	151	37	32	69	220
7:00 AM	TO	8:00 AM	248	279	527	152	158	310	837
8:00 AM	TO	9:00 AM	123	129	252	99	80	179	431
4:00 PM	TO	5:00 PM	230	180	410	195	187	382	792
5:00 PM	TO	6:00 PM	449	342	791	354	362	716	1507
6:00 PM	TO	7:00 PM	187	141	328	153	156	309	637
TOTAL VOLUME			1302	1157	2459	990	975	1965	4424
PERCENTAGE			29.4%	26.2%	55.6%	22.4%	22.0%	44.4%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & 10th Street
DATE : 9/12/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	1	1	2	57	3	60	3	0	3	61	4	65
7:00 AM - 8:00 AM	4	0	4	211	13	224	20	0	20	235	13	248
8:00 AM - 9:00 AM	2	0	2	102	2	104	17	0	17	121	2	123
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	2	0	2	189	1	190	38	0	38	229	1	230
5:00 PM - 6:00 PM	12	1	13	355	0	355	80	1	81	447	2	449
6:00 PM - 7:00 PM	10	0	10	157	0	157	20	0	20	187	0	187
PASSENGER	31			1071			178			1280		
	93.9%			98.3%			99.4%			98.3%		
TRUCK	2			19			1			22		
	6.1%			1.7%			0.6%			1.7%		
BOTH	33			1090			179			1302		
	2.5%			83.7%			13.7%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	7	1	8	73	4	77	1	0	1	81	5	86
7:00 AM - 8:00 AM	32	2	34	235	4	239	5	1	6	272	7	279
8:00 AM - 9:00 AM	16	0	16	109	3	112	1	0	1	126	3	129
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	36	0	36	136	2	138	6	0	6	178	2	180
5:00 PM - 6:00 PM	62	0	62	262	3	265	15	0	15	339	3	342
6:00 PM - 7:00 PM	33	0	33	102	2	104	4	0	4	139	2	141
PASSENGER	186			917			32			1135		
	98.4%			98.1%			97.0%			98.1%		
TRUCK	3			18			1			22		
	1.6%			1.9%			3.0%			1.9%		
BOTH	189			935			33			1157		
	16.3%			80.8%			2.9%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	0	0	0	33	2	35	2	0	2	35	2	37
7:00 AM - 8:00 AM	0	0	0	132	8	140	12	0	12	144	8	152
8:00 AM - 9:00 AM	0	0	0	82	3	85	13	1	14	95	4	99
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	0	0	0	171	2	173	22	0	22	193	2	195
5:00 PM - 6:00 PM	0	0	0	324	3	327	27	0	27	351	3	354
6:00 PM - 7:00 PM	1	0	1	141	1	142	10	0	10	152	1	153
PASSENGER	1			883			86			970		
	100.0%			97.9%			98.9%			98.0%		
TRUCK	0			19			1			20		
	0.0%			2.1%			1.1%			2.0%		
BOTH	1			902			87			990		
	0.1%			91.1%			8.8%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	1	0	1	21	0	21	10	0	10	32	0	32
7:00 AM - 8:00 AM	1	0	1	112	7	119	37	1	38	150	8	158
8:00 AM - 9:00 AM	2	0	2	54	6	60	17	1	18	73	7	80
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	1	0	1	108	3	111	75	0	75	184	3	187
5:00 PM - 6:00 PM	3	0	3	254	1	255	104	0	104	361	1	362
6:00 PM - 7:00 PM	0	0	0	120	0	120	36	0	36	156	0	156
PASSENGER	8			669			279			956		
	100.0%			97.5%			99.3%			98.1%		
TRUCK	0			17			2			19		
	0.0%			2.5%			0.7%			1.9%		
BOTH	8			686			281			975		
	0.8%			70.4%			28.8%			100.0%		

Release 11-18-04

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	270	70	5	310	40	120	150	40	50	200	40
Future Volume (veh/h)	10	270	70	5	310	40	120	150	40	50	200	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1811	1811	1811	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	11	293	76	5	337	43	130	163	43	54	217	43
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
Percent Heavy Veh, %	5	5	5	6	6	6	4	4	4	4	4	4
Cap, veh/h	387	464	120	393	523	67	483	469	124	526	498	99
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	979	1398	363	981	1574	201	1102	1404	370	1157	1492	296
Grp Volume(v), veh/h	11	0	369	5	0	380	130	0	206	54	0	260
Grp Sat Flow(s),veh/h/ln	979	0	1761	981	0	1775	1102	0	1774	1157	0	1788
Q Serve(g_s), s	0.3	0.0	5.3	0.1	0.0	5.4	3.1	0.0	2.6	1.1	0.0	3.4
Cycle Q Clear(g_c), s	5.7	0.0	5.3	5.4	0.0	5.4	6.5	0.0	2.6	3.7	0.0	3.4
Prop In Lane	1.00		0.21	1.00		0.11	1.00		0.21	1.00		0.17
Lane Grp Cap(c), veh/h	387	0	584	393	0	589	483	0	592	526	0	597
V/C Ratio(X)	0.03	0.00	0.63	0.01	0.00	0.64	0.27	0.00	0.35	0.10	0.00	0.44
Avail Cap(c_a), veh/h	913	0	1530	919	0	1542	1000	0	1423	1068	0	1434
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.9	0.0	8.4	10.7	0.0	8.5	10.3	0.0	7.5	8.9	0.0	7.8
Incr Delay (d2), s/veh	0.0	0.0	1.1	0.0	0.0	1.2	0.3	0.0	0.3	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	1.4	0.0	0.0	1.5	0.6	0.0	0.7	0.2	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.0	0.0	9.6	10.8	0.0	9.7	10.6	0.0	7.9	9.0	0.0	8.3
LnGrp LOS	B	A	A	B	A	A	B	A	A	A	A	A
Approach Vol, veh/h		380			385			336			314	
Approach Delay, s/veh		9.6			9.7			8.9			8.4	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	15.0	14.9	15.0	14.9
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	24.0	26.0	24.0	26.0
Max Q Clear Time (g_c+I1), s	8.5	7.7	5.7	7.4
Green Ext Time (p_c), s	1.5	2.2	1.6	2.3

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	730	80	5	600	130	60	370	110	50	250	20
Future Volume (veh/h)	5	730	80	5	600	130	60	370	110	50	250	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	793	87	5	652	141	65	402	120	54	272	22
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	828	91	146	745	161	345	461	138	173	569	46
Arrive On Green	0.50	0.50	0.50	0.50	0.50	0.50	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	684	1656	182	631	1490	322	1085	1383	413	880	1707	138
Grp Volume(v), veh/h	5	0	880	5	0	793	65	0	522	54	0	294
Grp Sat Flow(s),veh/h/ln	684	0	1838	631	0	1812	1085	0	1796	880	0	1846
Q Serve(g_s), s	0.4	0.0	27.6	0.5	0.0	23.3	3.0	0.0	16.4	3.6	0.0	7.6
Cycle Q Clear(g_c), s	23.7	0.0	27.6	28.0	0.0	23.3	10.6	0.0	16.4	20.0	0.0	7.6
Prop In Lane	1.00		0.10	1.00		0.18	1.00		0.23	1.00		0.07
Lane Grp Cap(c), veh/h	196	0	919	146	0	906	345	0	599	173	0	615
V/C Ratio(X)	0.03	0.00	0.96	0.03	0.00	0.88	0.19	0.00	0.87	0.31	0.00	0.48
Avail Cap(c_a), veh/h	196	0	919	146	0	906	345	0	599	173	0	615
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	14.4	27.8	0.0	13.3	20.1	0.0	18.8	28.2	0.0	15.9
Incr Delay (d2), s/veh	0.1	0.0	20.1	0.1	0.0	9.6	0.3	0.0	13.3	1.0	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	14.3	0.1	0.0	10.1	0.7	0.0	8.3	0.8	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	0.0	34.5	27.9	0.0	22.9	20.3	0.0	32.1	29.2	0.0	16.4
LnGrp LOS	C	A	C	C	A	C	C	A	C	C	A	B
Approach Vol, veh/h		885			798			587			348	
Approach Delay, s/veh		34.5			22.9			30.8			18.4	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.0	35.0	25.0	35.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	20.0	30.0	20.0	30.0
Max Q Clear Time (g_c+I1), s	18.4	29.6	22.0	30.0
Green Ext Time (p_c), s	0.6	0.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	28.0
HCM 6th LOS	C

LANE SUMMARY

Site: 101 [Pleasant Street & 10th Street - AM]

Network: N101 [Plesant Street AM Peak - S2A]

New Site
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: 10th Street															
Lane 1	130	3.0	130	3.0	933	0.140	100	5.2	LOS A	0.5	13.7	Short	200	0.0	NA
Lane 2[d]	207	3.0	207	3.0	1007	0.205	100	5.5	LOS A	0.8	20.8	Full	1600	0.0	0.0
Approach	337	3.0	337	3.0		0.205		5.4	LOS A	0.8	20.8				
East: Plasant Street															
Lane 1	186	3.0	186	3.0	982	0.189	100	5.5	LOS A	0.8	19.6	Short	350	0.0	NA
Lane 2[d]	200	3.0	200	3.0	1056	0.189	100	5.1	LOS A	0.8	19.2	Full	2200	0.0	0.0
Approach	386	3.0	386	3.0		0.189		5.3	LOS A	0.8	19.6				
North: 10th Street															
Lane 1	54	3.0	54	3.0	855	0.064	100	4.8	LOS A	0.2	5.6	Short	200	0.0	NA
Lane 2[d]	261	3.0	261	3.0	929	0.281	100	6.8	LOS A	1.1	28.4	Full	1600	0.0	0.0
Approach	315	3.0	315	3.0		0.281		6.4	LOS A	1.1	28.4				
West: Pleasant Street															
Lane 1[d]	226	3.0	226	3.0	1082	0.209	100	5.2	LOS A	0.8	21.6	Full	670	0.0	0.0
Lane 2	155	3.0	155	3.0	1008	0.154	74[6]	5.0	LOS A	0.6	15.5	Full	670	0.0	0.0
Approach	380	3.0	380	3.0		0.209		5.1	LOS A	0.8	21.6				
Intersection	1418	3.0	1418	3.0		0.281		5.5	LOS A	1.1	28.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %
Number of Iterations: 5 (maximum specified: 10)

6 Lane under-utilisation due to downstream effects
d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:07:44 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Final Scenario\Roundaboout Alternative AM Peak - S2A.sip7

LANE SUMMARY

Site: 101 [Pleasant Street & 10th Street - PM]

Network: N101 [Plesant Street PM Peak - S2A]

New Site
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: 10th Street															
Lane 1	65	3.0	65	3.0	584	0.112	14[5]	7.5	LOS A	0.4	9.8	Short	200	0.0	NA
Lane 2[d]	522	3.0	522	3.0	653	0.799	100	27.7	LOS C	6.5	166.2	Full	1600	0.0	0.0
Approach	587	3.0	587	3.0		0.799		25.5	LOS C	6.5	166.2				
East: Plasant Street															
Lane 1	383	3.0	383	3.0	837	0.457	100	10.1	LOS B	2.4	60.9	Short	350	0.0	NA
Lane 2[d]	416	3.0	416	3.0	911	0.457	100	9.5	LOS A	2.3	60.0	Full	2200	0.0	0.0
Approach	799	3.0	799	3.0		0.457		9.8	LOS A	2.4	60.9				
North: 10th Street															
Lane 1	54	3.0	54	3.0	675	0.081	20[5]	6.2	LOS A	0.3	7.0	Short	200	0.0	NA
Lane 2[d]	293	3.0	293	3.0	746	0.393	100	9.9	LOS A	1.7	43.5	Full	1600	0.0	0.0
Approach	348	3.0	348	3.0		0.393		9.3	LOS A	1.7	43.5				
West: Pleasant Street															
Lane 1[d]	526	3.0	526	3.0	1031	0.510	100	9.6	LOS A	2.9	74.9	Full	670	0.0	0.0
Lane 2	360	3.0	360	3.0	957	0.376	74[6]	7.9	LOS A	1.8	45.6	Full	670	0.0	0.0
Approach	886	3.0	886	3.0		0.510		8.9	LOS A	2.9	74.9				
Intersection	2620	3.0	2620	3.0		0.799		13.0	LOS B	6.5	166.2				

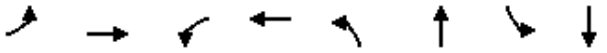
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %
Number of Iterations: 5 (maximum specified: 10)

5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects
d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:53:17 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Final Scenario\Roundaboout Alternative PM Peak - S2A.sip7

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	369	5	380	130	206	54	260
v/c Ratio	0.02	0.40	0.01	0.42	0.34	0.32	0.13	0.40
Control Delay	7.5	9.3	7.4	9.7	13.0	10.2	10.4	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	9.3	7.4	9.7	13.0	10.2	10.4	11.3
Queue Length 50th (ft)	1	41	1	44	16	22	6	30
Queue Length 95th (ft)	8	121	5	129	60	74	28	96
Internal Link Dist (ft)		588		845		466		510
Turn Bay Length (ft)	100		100		100		75	
Base Capacity (vph)	773	1402	774	1407	821	1335	862	1342
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.26	0.01	0.27	0.16	0.15	0.06	0.19

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	880	5	793	65	522	54	294
v/c Ratio	0.04	0.95	0.04	0.86	0.22	0.87	0.42	0.49
Control Delay	8.6	35.9	8.8	24.6	16.7	35.6	27.5	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	35.9	8.8	24.6	16.7	35.6	27.5	18.8
Queue Length 50th (ft)	1	278	1	226	17	163	15	80
Queue Length 95th (ft)	6	#525	6	#447	43	#325	#48	143
Internal Link Dist (ft)		588		845		466		510
Turn Bay Length (ft)	100		100		100		75	
Base Capacity (vph)	139	960	132	954	321	640	137	642
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.92	0.04	0.83	0.20	0.82	0.39	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

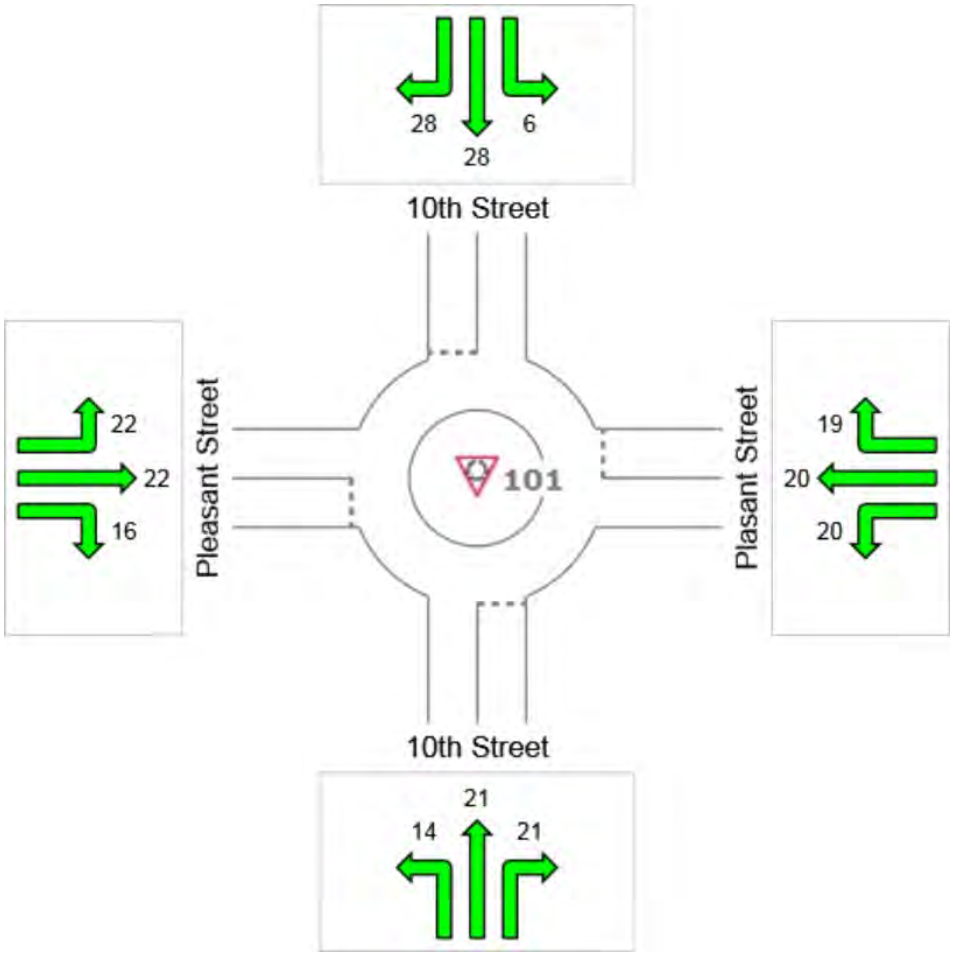
Site: 101 [Pleasant Street & 10th Street - AM]

Network: N101 [Plesant Street AM Peak - S2A]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Vehicle Queue (%ile)	21	20	28	22	28



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

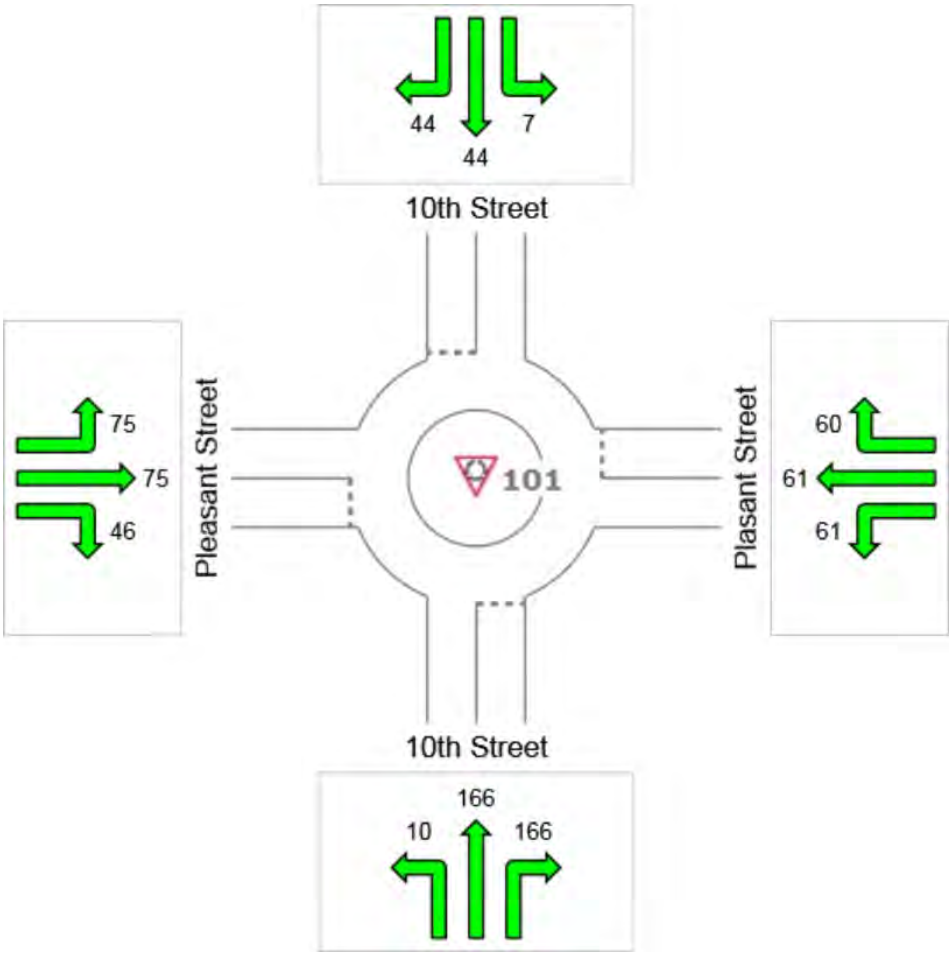
Site: 101 [Pleasant Street & 10th Street - PM]

Network: N101 [Plesant Street PM Peak - S2A]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Vehicle Queue (%ile)	166	61	44	75	166



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

PLEASANT STREET & 8TH STREET

TRAFFIC VOLUME COUNTS
CAPACITY ANALYSIS
QUEUE LENGTH ANALYSIS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & 8th Street
DATE : 9/12/2017
COUNTED BY : Miovision

	TOTAL VEHICLES (PASSENGER CARS + TRUCKS)											
	AM PEAK HOUR VOLUMES BEGINS 7:15 AM				OFF PEAK HOUR VOLUMES BEGINS				PM PEAK HOUR VOLUMES BEGINS 4:30 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	1	264	13	**278**					9	398	35	**442**
SOUTHBOUND	126	442	8	**576**					309	471	5	**785**
EASTBOUND	1	9	6	**16**					2	1	4	**7**
WESTBOUND	13	14	82	**109**					10	5	162	**177**

	PEAK HOUR FACTOR					
	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
NORTHBOUND	0.94	0.96			0.94	0.94
SOUTHBOUND	0.93				0.96	
EASTBOUND	0.57				0.58	
WESTBOUND	0.88				0.85	

	TRUCK PERCENTAGE											
	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
NORTHBOUND	0.0%	4.9%	38.5%	6.5%					0.0%	1.0%	0.0%	0.9%
SOUTHBOUND	1.6%	2.9%	12.5%	2.8%					1.3%	1.3%	0.0%	1.3%
EASTBOUND	0.0%	11.1%	0.0%	6.3%					0.0%	0.0%	0.0%	0.0%
WESTBOUND	46.2%	14.3%	2.4%	9.2%					30.0%	20.0%	0.6%	2.8%

HOURLY SUMMARY								
HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM	122	210	332	0	21	21	353
7:00 AM	TO	8:00 AM	280	554	834	14	100	114	948
8:00 AM	TO	9:00 AM	149	278	427	7	50	57	484
4:00 PM	TO	5:00 PM	231	391	622	2	78	80	702
5:00 PM	TO	6:00 PM	399	750	1149	17	207	224	1373
6:00 PM	TO	7:00 PM	148	300	448	6	107	113	561
TOTAL VOLUME			1329	2483	3812	46	563	609	4421
PERCENTAGE			30.1%	56.2%	86.2%	1.0%	12.7%	13.8%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : Pleasant Street & 8th Street
DATE : 9/12/2017

DIRECTION OF TRAVEL : NORTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	2	0	2	115	3	118	0	2	2	117	5	122
7:00 AM - 8:00 AM	1	0	1	256	11	267	6	6	12	263	17	280
8:00 AM - 9:00 AM	2	0	2	132	10	142	4	1	5	138	11	149
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	5	0	5	201	3	204	22	0	22	228	3	231
5:00 PM - 6:00 PM	11	0	11	370	2	372	16	0	16	397	2	399
6:00 PM - 7:00 PM	3	0	3	137	4	141	4	0	4	144	4	148
PASSENGER	24			1211			52			1287		
	100.0%			97.3%			85.2%			96.8%		
TRUCK	0			33			9			42		
	0.0%			2.7%			14.8%			3.2%		
BOTH	24			1244			61			1329		
	1.8%			93.6%			4.6%			100.0%		

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	33	0	33	175	1	176	1	0	1	209	1	210
7:00 AM - 8:00 AM	120	3	123	415	10	425	5	1	6	540	14	554
8:00 AM - 9:00 AM	74	2	76	194	5	199	3	0	3	271	7	278
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	152	2	154	229	5	234	3	0	3	384	7	391
5:00 PM - 6:00 PM	288	3	291	450	3	453	6	0	6	744	6	750
6:00 PM - 7:00 PM	128	2	130	164	4	168	2	0	2	294	6	300
PASSENGER	795			1627			20			2442		
	98.5%			98.3%			95.2%			98.3%		
TRUCK	12			28			1			41		
	1.5%			1.7%			4.8%			1.7%		
BOTH	807			1655			21			2483		
	32.5%			66.7%			0.8%			100.0%		

DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM - 8:00 AM	1	0	1	8	0	8	5	0	5	14	0	14
8:00 AM - 9:00 AM	0	0	0	1	1	2	5	0	5	6	1	7
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	1	0	1	0	0	0	1	0	1	2	0	2
5:00 PM - 6:00 PM	3	0	3	10	0	10	4	0	4	17	0	17
6:00 PM - 7:00 PM	2	0	2	3	0	3	0	1	1	5	1	6
PASSENGER	7			22			15			44		
	100.0%			95.7%			93.8%			95.7%		
TRUCK	0			1			1			2		
	0.0%			4.3%			6.3%			4.3%		
BOTH	7			23			16			46		
	15.2%			50.0%			34.8%			100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	6	0	6	3	0	3	11	1	12	20	1	21
7:00 AM - 8:00 AM	8	6	14	11	1	12	73	1	74	92	8	100
8:00 AM - 9:00 AM	2	2	4	4	1	5	37	4	41	43	7	50
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
4:00 PM - 5:00 PM	4	2	6	3	1	4	68	0	68	75	3	78
5:00 PM - 6:00 PM	3	1	4	9	0	9	193	1	194	205	2	207
6:00 PM - 7:00 PM	2	0	2	9	0	9	96	0	96	107	0	107
PASSENGER	25			39			478			542		
	69.4%			92.9%			98.6%			96.3%		
TRUCK	11			3			7			21		
	30.6%			7.1%			1.4%			3.7%		
BOTH	36			42			485			563		
	6.4%			7.5%			86.1%			100.0%		

Release 11-18-04

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	240	290	30	350	100	180	150	30	90	270	10
Future Volume (veh/h)	5	240	290	30	350	100	180	150	30	90	270	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1811	1811	1811	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	6	276	333	34	402	115	207	172	34	103	310	11
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	5	5	5	6	6	6	4	4	4	4	4	4
Cap, veh/h	292	332	400	208	597	171	374	400	79	433	387	14
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.12	0.27	0.27	0.07	0.22	0.22
Sat Flow, veh/h	863	753	909	786	1354	387	1753	1493	295	1753	1767	63
Grp Volume(v), veh/h	6	0	609	34	0	517	207	0	206	103	0	321
Grp Sat Flow(s),veh/h/ln	863	0	1662	786	0	1741	1753	0	1788	1753	0	1829
Q Serve(g_s), s	0.3	0.0	20.2	2.5	0.0	14.7	5.4	0.0	5.9	2.8	0.0	10.4
Cycle Q Clear(g_c), s	15.1	0.0	20.2	22.7	0.0	14.7	5.4	0.0	5.9	2.8	0.0	10.4
Prop In Lane	1.00		0.55	1.00		0.22	1.00		0.17	1.00		0.03
Lane Grp Cap(c), veh/h	292	0	732	208	0	767	374	0	480	433	0	400
V/C Ratio(X)	0.02	0.00	0.83	0.16	0.00	0.67	0.55	0.00	0.43	0.24	0.00	0.80
Avail Cap(c_a), veh/h	410	0	959	315	0	1005	395	0	688	484	0	645
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	15.4	25.4	0.0	13.9	16.1	0.0	18.9	17.0	0.0	23.1
Incr Delay (d2), s/veh	0.0	0.0	4.9	0.4	0.0	1.1	1.5	0.0	0.6	0.3	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	7.5	0.5	0.0	5.2	2.1	0.0	2.4	1.1	0.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.9	0.0	20.3	25.8	0.0	15.0	17.7	0.0	19.5	17.3	0.0	26.8
LnGrp LOS	B	A	C	C	A	B	B	A	B	B	A	C
Approach Vol, veh/h		615			551			413			424	
Approach Delay, s/veh		20.3			15.7			18.6			24.5	
Approach LOS		C			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.2	21.7		32.5	11.2	18.7		32.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	6.3	24.0		36.0	8.0	22.0		36.0
Max Q Clear Time (g_c+I1), s	4.8	7.9		22.2	7.4	12.4		24.7
Green Ext Time (p_c), s	0.0	1.0		3.8	0.0	1.3		2.8

Intersection Summary	
HCM 6th Ctrl Delay	19.6
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	490	290	20	520	140	190	330	30	290	260	10
Future Volume (veh/h)	5	490	290	20	520	140	190	330	30	290	260	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	563	333	23	598	161	218	379	34	333	299	11
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	144	529	313	72	682	184	385	405	36	341	537	20
Arrive On Green	0.48	0.48	0.48	0.48	0.48	0.48	0.08	0.24	0.24	0.14	0.30	0.30
Sat Flow, veh/h	706	1102	652	621	1419	382	1781	1691	152	1781	1793	66
Grp Volume(v), veh/h	6	0	896	23	0	759	218	0	413	333	0	310
Grp Sat Flow(s),veh/h/ln	706	0	1753	621	0	1802	1781	0	1843	1781	0	1858
Q Serve(g_s), s	0.8	0.0	48.0	0.0	0.0	37.8	8.0	0.0	21.9	13.8	0.0	14.0
Cycle Q Clear(g_c), s	38.6	0.0	48.0	48.0	0.0	37.8	8.0	0.0	21.9	13.8	0.0	14.0
Prop In Lane	1.00		0.37	1.00		0.21	1.00		0.08	1.00		0.04
Lane Grp Cap(c), veh/h	144	0	842	72	0	865	385	0	442	341	0	557
V/C Ratio(X)	0.04	0.00	1.06	0.32	0.00	0.88	0.57	0.00	0.93	0.98	0.00	0.56
Avail Cap(c_a), veh/h	144	0	842	72	0	865	385	0	442	341	0	558
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.7	0.0	26.0	50.0	0.0	23.3	27.9	0.0	37.2	25.5	0.0	29.4
Incr Delay (d2), s/veh	0.1	0.0	49.6	2.5	0.0	10.2	1.9	0.0	27.2	42.2	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	30.3	0.6	0.0	17.6	0.8	0.0	13.0	9.6	0.0	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.8	0.0	75.6	52.5	0.0	33.5	29.8	0.0	64.4	67.7	0.0	30.6
LnGrp LOS	D	A	F	D	A	C	C	A	E	E	A	C
Approach Vol, veh/h		902			782			631			643	
Approach Delay, s/veh		75.4			34.1			52.4			49.8	
Approach LOS		E			C			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.0	29.0		53.0	12.0	35.0		53.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	14.0	24.0		48.0	8.0	30.0		48.0
Max Q Clear Time (g_c+I1), s	15.8	23.9		50.0	10.0	16.0		50.0
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	1.5		0.0

Intersection Summary	
HCM 6th Ctrl Delay	54.0
HCM 6th LOS	D

LANE SUMMARY

Site: 101 [Pleasant Street & 8th Street - AM]

Network: N101 [Plesant Street AM Peak - S2A]

New Site
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: 8th Street															
Lane 1	196	3.0	196	3.0	928	0.211	100	6.0	LOS A	0.9	21.9	Short	200	0.0	NA
Lane 2[d]	196	3.0	196	3.0	1002	0.195	100	5.4	LOS A	0.8	19.6	Full	1600	0.0	0.0
Approach	391	3.0	391	3.0		0.211		5.7	LOS A	0.9	21.9				
East: Pleasant Street															
Lane 1[d]	355	3.0	355	3.0	1002	0.354	100	7.3	LOS A	1.6	41.0	Full	670	0.0	0.0
Lane 2	166	3.0	166	3.0	928	0.179	51[6]	5.6	LOS A	0.7	18.1	Full	670	0.0	0.0
Approach	522	3.0	522	3.0		0.354		6.8	LOS A	1.6	41.0				
North: 8th Street															
Lane 1	98	3.0	98	3.0	736	0.133	100	6.3	LOS A	0.5	12.3	Short	200	0.0	NA
Lane 2[d]	304	3.0	304	3.0	809	0.376	100	9.0	LOS A	1.7	42.3	Full	1600	0.0	0.0
Approach	402	3.0	402	3.0		0.376		8.3	LOS A	1.7	42.3				
West: Plesasant Street															
Lane 1	266	3.0	266	3.0	877	0.304	92[5]	7.4	LOS A	1.3	33.3	Short	200	0.0	NA
Lane 2[d]	315	3.0	315	3.0	951	0.331	100	7.3	LOS A	1.4	36.7	Full	4169	0.0	0.0
Approach	582	3.0	582	3.0		0.331		7.4	LOS A	1.4	36.7				
Intersection	1897	3.0	1897	3.0		0.376		7.1	LOS A	1.7	42.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %
Number of Iterations: 5 (maximum specified: 10)

5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects
d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:07:44 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Final Scenario\Roundaboout Alternative AM Peak - S2A.sip7

LANE SUMMARY

Site: 101 [Pleasant Street & 8th Street - PM]

Network: N101 [Plesant Street PM Peak - S2A]

New Site
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: 8th Street															
Lane 1	207	3.0	207	3.0	584	0.354	100	11.3	LOS B	1.5	37.1	Short	200	0.0	NA
Lane 2[d]	391	3.0	391	3.0	653	0.599	100	16.4	LOS B	3.4	86.1	Full	4169	0.0	0.0
Approach	598	3.0	598	3.0		0.599		14.6	LOS B	3.4	86.1				
East: Pleasant Street															
Lane 1[d]	442	3.0	442	3.0	837	0.528	100	11.7	LOS B	3.0	76.5	Full	670	0.0	0.0
Lane 2	297	3.0	297	3.0	763	0.389	74[6]	9.6	LOS A	1.8	45.5	Full	670	0.0	0.0
Approach	739	3.0	739	3.0		0.528		10.8	LOS B	3.0	76.5				
North: 8th Street															
Lane 1[d]	315	3.0	315	3.0	688	0.458	100	11.9	LOS B	2.2	55.5	Short	200	0.0	NA
Lane 2	293	3.0	293	3.0	618	0.475	100	13.4	LOS B	2.3	59.0	Full	1600	0.0	0.0
Approach	609	3.0	609	3.0		0.475		12.6	LOS B	2.3	59.0				
West: Plesasant Street															
Lane 1	406	3.0	406	3.0	729	0.558	100	13.8	LOS B	3.3	83.4	Short	350	0.0	NA
Lane 2[d]	447	3.0	447	3.0	801	0.558	100	12.8	LOS B	3.2	83.2	Full	4169	0.0	0.0
Approach	853	3.0	853	3.0		0.558		13.3	LOS B	3.3	83.4				
Intersection	2799	3.0	2799	3.0		0.599		12.8	LOS B	3.4	86.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %
Number of Iterations: 5 (maximum specified: 10)

6 Lane under-utilisation due to downstream effects
d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:53:17 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Final Scenario\Roundaboout Alternative PM Peak - S2A.sip7

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	6	609	34	517	207	206	103	321
v/c Ratio	0.03	0.84	0.26	0.73	0.52	0.35	0.22	0.71
Control Delay	12.8	26.6	19.6	22.8	18.6	21.2	14.0	33.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	26.6	19.6	22.8	18.6	21.2	14.0	33.1
Queue Length 50th (ft)	1	178	9	160	50	63	23	117
Queue Length 95th (ft)	8	320	30	276	106	128	57	216
Internal Link Dist (ft)		355		588		474		528
Turn Bay Length (ft)	100		100		65		100	
Base Capacity (vph)	285	994	186	1003	397	689	470	638
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.61	0.18	0.52	0.52	0.30	0.22	0.50

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	6	896	23	759	218	413	333	310
v/c Ratio	0.06	1.03	0.31	0.86	0.60	0.94	1.02	0.56
Control Delay	15.8	65.1	29.8	34.6	28.5	68.9	82.2	34.0
Queue Delay	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
Total Delay	15.8	65.1	29.8	35.3	28.5	68.9	82.2	34.0
Queue Length 50th (ft)	2	~604	9	407	88	256	~167	164
Queue Length 95th (ft)	9	#795	32	#607	137	#416	#326	241
Internal Link Dist (ft)		355		588		474		528
Turn Bay Length (ft)	100		100		65		100	
Base Capacity (vph)	108	868	74	878	365	446	326	559
Starvation Cap Reductn	0	0	0	20	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	1.03	0.31	0.88	0.60	0.93	1.02	0.55

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

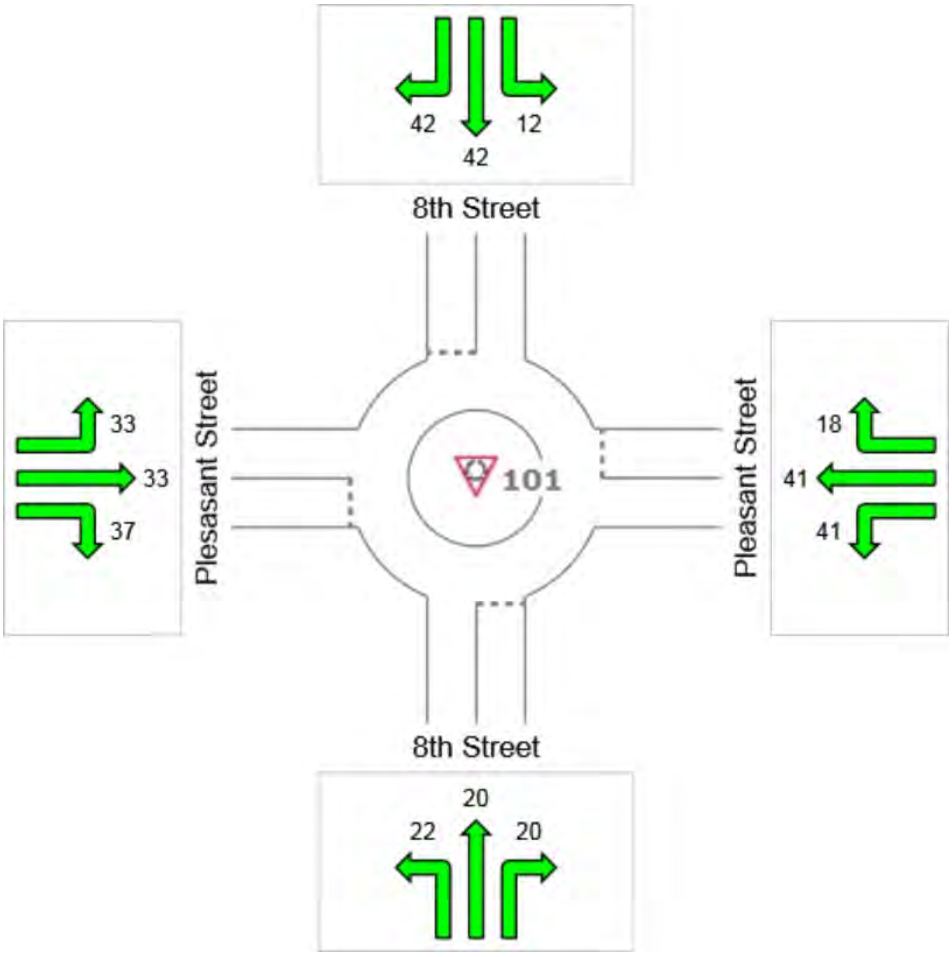
Site: 101 [Pleasant Street & 8th Street - AM]

Network: N101 [Plesant Street AM Peak - S2A]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Vehicle Queue (%ile)	22	41	42	37	42



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

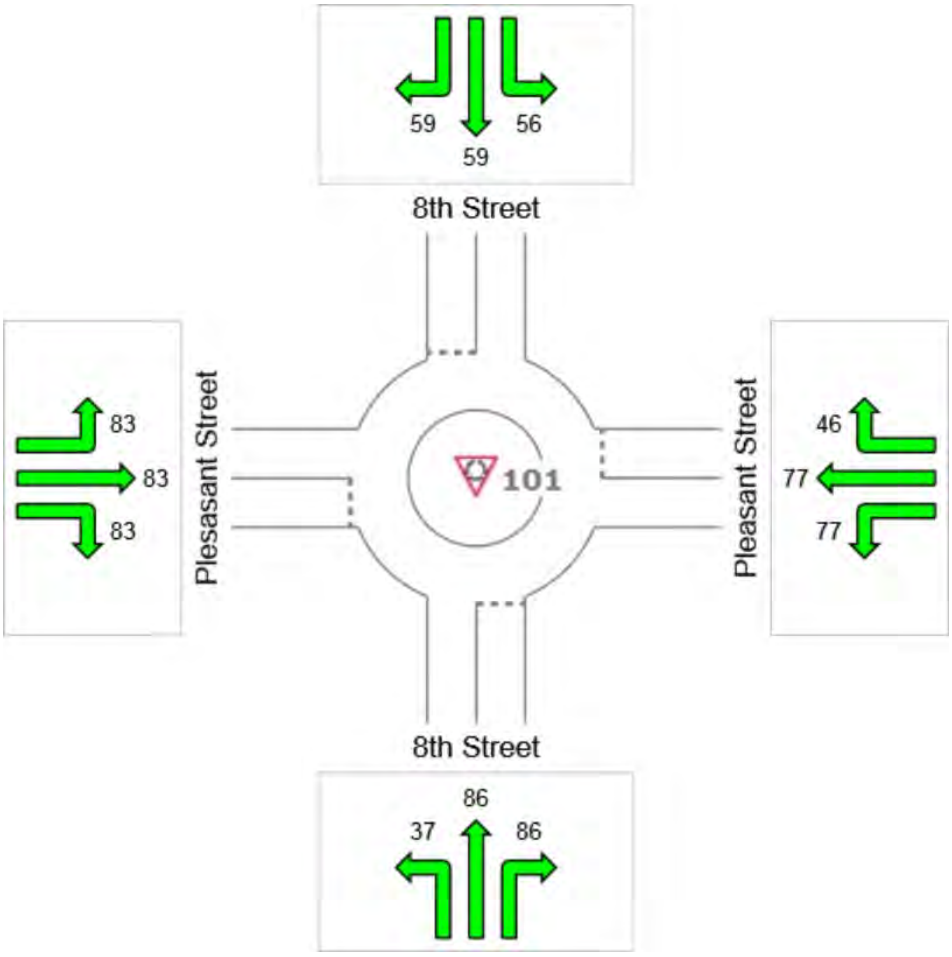
Site: 101 [Pleasant Street & 8th Street - PM]

Network: N101 [Plesant Street PM Peak - S2A]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Vehicle Queue (%ile)	86	77	59	83	86



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

PLEASANT STREET & RIVER ROAD

CAPACITY ANALYSIS
QUEUE LENGTH ANALYSIS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	320	60	50	170	140	70	90	60	60	160	5
Future Volume (veh/h)	5	320	60	50	170	140	70	90	60	60	160	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	348	65	54	185	152	76	98	65	65	174	5
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	389	476	89	367	341	280	365	169	112	367	279	8
Arrive On Green	0.01	0.31	0.31	0.06	0.36	0.36	0.07	0.16	0.16	0.06	0.15	0.15
Sat Flow, veh/h	1781	1533	286	1781	950	780	1781	1049	696	1781	1809	52
Grp Volume(v), veh/h	5	0	413	54	0	337	76	0	163	65	0	179
Grp Sat Flow(s),veh/h/ln	1781	0	1819	1781	0	1730	1781	0	1745	1781	0	1861
Q Serve(g_s), s	0.1	0.0	8.9	0.9	0.0	6.8	1.5	0.0	3.8	1.3	0.0	3.9
Cycle Q Clear(g_c), s	0.1	0.0	8.9	0.9	0.0	6.8	1.5	0.0	3.8	1.3	0.0	3.9
Prop In Lane	1.00		0.16	1.00		0.45	1.00		0.40	1.00		0.03
Lane Grp Cap(c), veh/h	389	0	564	367	0	620	365	0	280	367	0	287
V/C Ratio(X)	0.01	0.00	0.73	0.15	0.00	0.54	0.21	0.00	0.58	0.18	0.00	0.62
Avail Cap(c_a), veh/h	621	0	1497	514	0	1424	486	0	958	500	0	1021
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.5	0.0	13.5	10.0	0.0	11.2	14.0	0.0	17.0	14.1	0.0	17.3
Incr Delay (d2), s/veh	0.0	0.0	1.9	0.2	0.0	0.7	0.3	0.0	1.9	0.2	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.2	0.3	0.0	2.2	0.5	0.0	1.5	0.5	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.5	0.0	15.3	10.2	0.0	11.9	14.3	0.0	18.9	14.3	0.0	19.5
LnGrp LOS	B	A	B	B	A	B	B	A	B	B	A	B
Approach Vol, veh/h		418			391			239			244	
Approach Delay, s/veh		15.3			11.7			17.4			18.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.7	12.0	6.4	18.6	7.0	11.7	4.3	20.7
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	6.0	24.0	6.0	36.0	6.0	24.0	6.0	36.0
Max Q Clear Time (g_c+I1), s	3.3	5.8	2.9	10.9	3.5	5.9	2.1	8.8
Green Ext Time (p_c), s	0.0	0.8	0.0	2.7	0.0	0.9	0.0	2.2

Intersection Summary	
HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	360	60	30	250	270	120	240	70	120	170	5
Future Volume (veh/h)	5	360	60	30	250	270	120	240	70	120	170	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	391	65	33	272	293	130	261	76	130	185	5
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	203	564	94	317	321	345	431	327	95	316	426	12
Arrive On Green	0.01	0.36	0.36	0.04	0.39	0.39	0.08	0.23	0.23	0.08	0.23	0.23
Sat Flow, veh/h	1781	1564	260	1781	824	887	1781	1392	405	1781	1813	49
Grp Volume(v), veh/h	5	0	456	33	0	565	130	0	337	130	0	190
Grp Sat Flow(s),veh/h/ln	1781	0	1824	1781	0	1711	1781	0	1797	1781	0	1862
Q Serve(g_s), s	0.1	0.0	13.1	0.7	0.0	18.6	3.3	0.0	10.9	3.3	0.0	5.4
Cycle Q Clear(g_c), s	0.1	0.0	13.1	0.7	0.0	18.6	3.3	0.0	10.9	3.3	0.0	5.4
Prop In Lane	1.00		0.14	1.00		0.52	1.00		0.23	1.00		0.03
Lane Grp Cap(c), veh/h	203	0	658	317	0	666	431	0	422	316	0	437
V/C Ratio(X)	0.02	0.00	0.69	0.10	0.00	0.85	0.30	0.00	0.80	0.41	0.00	0.43
Avail Cap(c_a), veh/h	364	0	1034	428	0	970	466	0	728	351	0	754
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.7	0.0	16.8	12.9	0.0	17.2	16.0	0.0	22.2	16.8	0.0	20.1
Incr Delay (d2), s/veh	0.0	0.0	1.3	0.1	0.0	4.9	0.4	0.0	3.5	0.9	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	5.2	0.3	0.0	7.3	1.3	0.0	4.7	1.3	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.7	0.0	18.1	13.1	0.0	22.1	16.4	0.0	25.7	17.7	0.0	20.8
LnGrp LOS	B	A	B	B	A	C	B	A	C	B	A	C
Approach Vol, veh/h		461			598			467			320	
Approach Delay, s/veh		18.1			21.6			23.1			19.5	
Approach LOS		B			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	19.5	6.2	27.3	8.8	19.5	4.4	29.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	6.0	25.0	6.0	35.0	6.0	25.0	6.0	35.0
Max Q Clear Time (g_c+I1), s	5.3	12.9	2.7	15.1	5.3	7.4	2.1	20.6
Green Ext Time (p_c), s	0.0	1.6	0.0	2.9	0.0	0.9	0.0	3.4

Intersection Summary	
HCM 6th Ctrl Delay	20.7
HCM 6th LOS	C

LANE SUMMARY

Site: 101 [Pleasant Street & River Road- AM]

Network: N101 [Plesant Street AM Peak - S2A]

New Site
Roundabout

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: 8th Street															
Lane 1[d]	239	2.0	239	2.0	875	0.273	100	7.0	LOS A	1.3	32.3	Full	1600	0.0	0.0
Approach	239	2.0	239	2.0		0.273		7.0	LOS A	1.3	32.3				
East: Pleasant Street															
Lane 1[d]	391	2.0	391	2.0	1123	0.349	100	6.7	LOS A	1.9	49.5	Full	4169	0.0	0.0
Approach	391	2.0	391	2.0		0.349		6.7	LOS A	1.9	49.5				
North: 8th Street															
Lane 1[d]	245	2.0	245	2.0	975	0.251	100	6.2	LOS A	1.2	30.3	Full	1600	0.0	0.0
Approach	245	2.0	245	2.0		0.251		6.2	LOS A	1.2	30.3				
West: Plesasant Street															
Lane 1[d]	418	2.0	418	2.0	997	0.420	100	8.3	LOS A	2.4	60.2	Full	3692	0.0	0.0
Approach	418	2.0	418	2.0		0.420		8.3	LOS A	2.4	60.2				
Intersection	1293	2.0	1293	2.0		0.420		7.2	LOS A	2.4	60.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %
Number of Iterations: 5 (maximum specified: 10)

d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:07:44 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Final Scenario\Roundaboout Alternative AM Peak - S2A.sip7

LANE SUMMARY

Site: 101 [Pleasant Street & River Road- PM]

Network: N101 [Plesant Street PM Peak - S2A]

New Site
Roundabout

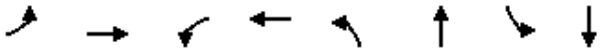
Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist ft		ft	%	%
South: 8th Street															
Lane 1[d]	467	2.0	467	2.0	782	0.598	100	14.2	LOS B	4.3	109.3	Full	1600	0.0	0.0
Approach	467	2.0	467	2.0		0.598		14.2	LOS B	4.3	109.3				
East: Pleasant Street															
Lane 1[d]	598	2.0	598	2.0	895	0.668	100	15.0	LOS B	6.0	151.6	Full	4169	0.0	0.0
Approach	598	2.0	598	2.0		0.668		15.0	LOS B	6.0	151.6				
North: 8th Street															
Lane 1[d]	321	2.0	321	2.0	861	0.373	100	8.5	LOS A	1.9	47.4	Full	1600	0.0	0.0
Approach	321	2.0	321	2.0		0.373		8.5	LOS A	1.9	47.4				
West: Plesasant Street															
Lane 1[d]	462	2.0	462	2.0	942	0.490	100	9.9	LOS A	3.1	77.6	Full	3692	0.0	0.0
Approach	462	2.0	462	2.0		0.490		9.9	LOS A	3.1	77.6				
Intersection	1848	2.0	1848	2.0		0.668		12.4	LOS B	6.0	151.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.1 %
Number of Iterations: 5 (maximum specified: 10)

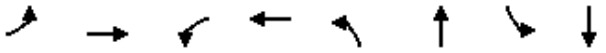
d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 24, 2017 9:53:17 AM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\Final Scenario\Roundaboout Alternative PM Peak - S2A.sip7



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	413	54	337	76	163	65	179
v/c Ratio	0.01	0.47	0.10	0.35	0.16	0.30	0.13	0.37
Control Delay	8.4	18.3	9.1	11.8	14.9	19.5	14.8	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	18.3	9.1	11.8	14.9	19.5	14.8	25.0
Queue Length 50th (ft)	1	126	9	59	17	40	15	58
Queue Length 95th (ft)	6	237	28	170	51	104	45	130
Internal Link Dist (ft)		2246		2402		771		764
Turn Bay Length (ft)	100		100		100		100	
Base Capacity (vph)	620	1247	531	1205	500	932	517	970
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.33	0.10	0.28	0.15	0.17	0.13	0.18

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	456	33	565	130	337	130	190
v/c Ratio	0.02	0.64	0.09	0.75	0.27	0.66	0.37	0.37
Control Delay	11.0	22.9	11.5	23.4	16.4	29.9	18.0	24.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	22.9	11.5	23.4	16.4	29.9	18.0	24.7
Queue Length 50th (ft)	1	131	7	159	28	108	28	58
Queue Length 95th (ft)	7	306	23	#422	86	255	86	146
Internal Link Dist (ft)		2246		2402		771		764
Turn Bay Length (ft)	100		100		100		100	
Base Capacity (vph)	322	1103	380	1079	475	791	354	807
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.41	0.09	0.52	0.27	0.43	0.37	0.24

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

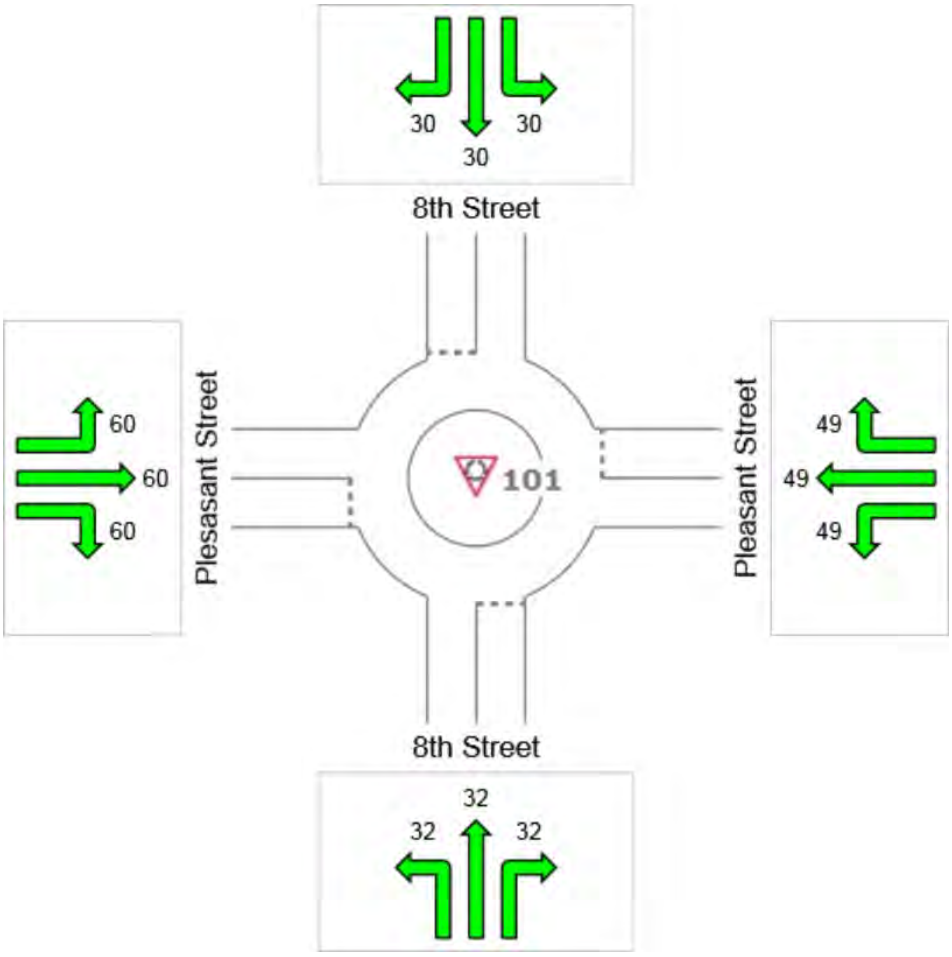
Site: 101 [Pleasant Street & River Road- AM]

Network: N101 [Plesant Street AM Peak - S2A]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Vehicle Queue (%ile)	32	49	30	60	60



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

QUEUE DISTANCE (%ILE)

Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

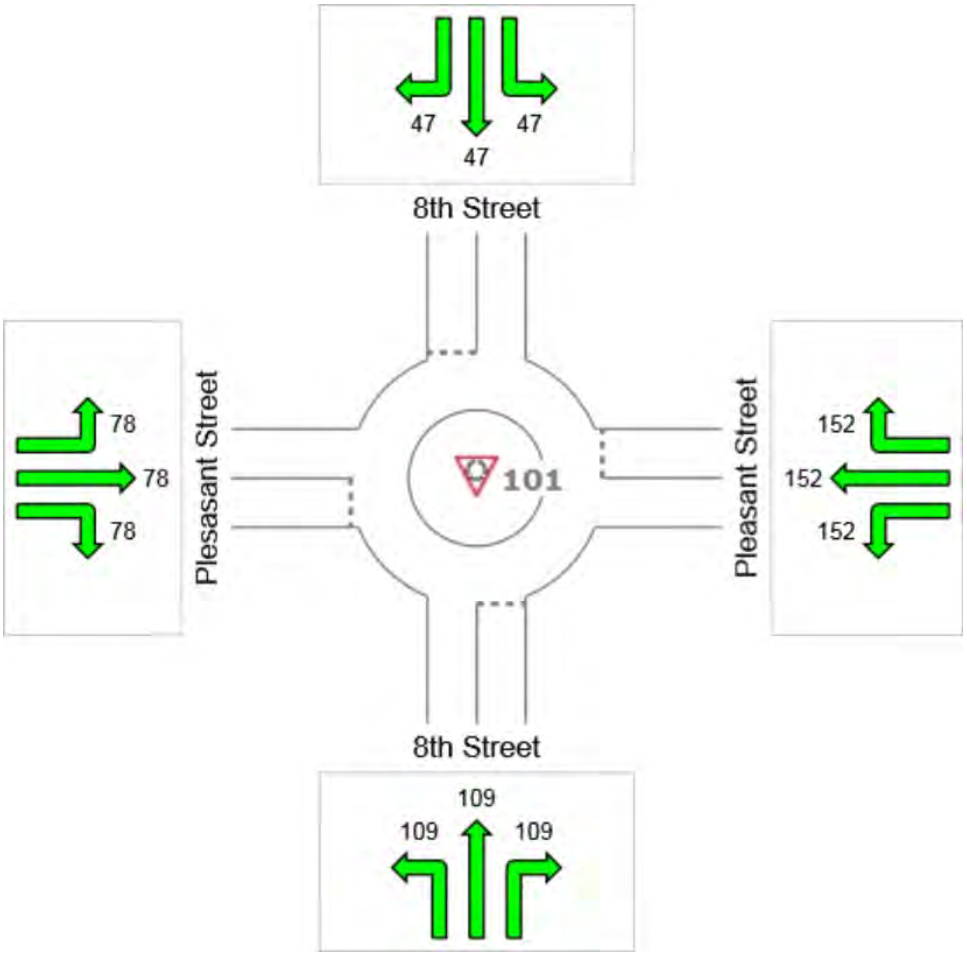
Site: 101 [Pleasant Street & River Road- PM]

Network: N101 [Plesant Street PM Peak - S2A]

New Site
Roundabout

All Movement Classes

	South	East	North	West	Intersection
Vehicle Queue (%ile)	109	152	47	78	152



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

SR 32 & HAGUE ROAD/PLEASANT STREET

TRAFFIC VOLUME COUNTS
CAPACITY ANALYSIS
QUEUE LENGTH ANALYSIS

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT :	City of Noblesville
INTERSECTION :	SR 32 & Hague Road
DATE :	9/6/2017
COUNTED BY :	Miovision

TOTAL VEHICLES (PASSENGER CARS + TRUCKS)

	AM PEAK HOUR VOLUMES BEGINS 7:00 AM				OFF PEAK HOUR VOLUMES BEGINS 2:00 PM				PM PEAK HOUR VOLUMES BEGINS 5:00 PM			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
SOUTHBOUND	42		257	**299**	35		90	**125**	41		139	**180**
EASTBOUND	94	625		**719**	113	647		**760**	299	794		**1093**
WESTBOUND		779	30	**809**		682	53	**735**		752	117	**869**

PEAK HOUR FACTOR

	AM PEAK HOUR FACTOR		OFF PEAK HOUR FACTOR		PM PEAK HOUR FACTOR	
	APPROACH	INTERSECTION	APPROACH	INTERSECTION	APPROACH	INTERSECTION
SOUTHBOUND	0.83		0.82		0.80	
EASTBOUND	0.91	0.94	0.84	0.85	0.98	0.94
WESTBOUND	0.91		0.86		0.91	

TRUCK PERCENTAGE

	AM PEAK HOUR PERCENTAGE				OFF PEAK HOUR PERCENTAGE				PM PEAK HOUR PERCENTAGE			
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL
SOUTHBOUND	0.0%		2.7%	5.0%	8.6%		11.1%	23.2%	4.9%		2.9%	8.9%
EASTBOUND	12.8%	6.6%		8.8%	8.8%	10.4%		14.1%	1.7%	2.6%		3.2%
WESTBOUND		7.6%	10.0%	8.2%		9.8%	1.9%	10.3%		2.8%	1.7%	3.1%

HOURLY SUMMARY

HOUR			NB	SB	NB+SB	EB	WB	EB+WB	TOTAL
6:00 AM	TO	7:00 AM		154	154	326	488	814	968
7:00 AM	TO	8:00 AM		299	299	719	809	1528	1827
8:00 AM	TO	9:00 AM		204	204	717	728	1445	1649
10:00 AM	TO	11:00 AM		102	102	567	509	1076	1178
11:00 AM	TO	12:00 PM		118	118	636	576	1212	1330
12:00 PM	TO	1:00 PM		123	123	680	677	1357	1480
1:00 PM	TO	2:00 PM		127	127	731	668	1399	1526
2:00 PM	TO	3:00 PM		125	125	760	735	1495	1620
3:00 PM	TO	4:00 PM		120	120	857	755	1612	1732
4:00 PM	TO	5:00 PM		175	175	988	821	1809	1984
5:00 PM	TO	6:00 PM		180	180	1093	869	1962	2142
6:00 PM	TO	7:00 PM		184	184	842	630	1472	1656
TOTAL VOLUME				1911	1911	8916	8265	17181	19092
PERCENTAGE				10.0%	10.0%	46.7%	43.3%	90.0%	100.0%

Release 11-18-04

A & F ENGINEERING CO., LLC
TRAFFIC VOLUME SUMMARY

CLIENT : City of Noblesville
INTERSECTION : SR 32 & Hague Road
DATE : 9/6/2017

DIRECTION OF TRAVEL : SOUTHBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	12	0	12				141	1	142	153	1	154
7:00 AM - 8:00 AM	42	0	42				250	7	257	292	7	299
8:00 AM - 9:00 AM	41	2	43				156	5	161	197	7	204
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	28	0	28				74	0	74	102	0	102
11:00 AM - 12:00 PM	37	1	38				75	5	80	112	6	118
12:00 PM - 1:00 PM	33	3	36				82	5	87	115	8	123
1:00 PM - 2:00 PM	41	1	42				79	6	85	120	7	127
2:00 PM - 3:00 PM	32	3	35				80	10	90	112	13	125
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	30	0	30				86	4	90	116	4	120
4:00 PM - 5:00 PM	49	0	49				124	2	126	173	2	175
5:00 PM - 6:00 PM	39	2	41				135	4	139	174	6	180
6:00 PM - 7:00 PM	46	0	46				137	1	138	183	1	184
PASSENGER	430 97.3%						1419 96.6%			1849 96.8%		
TRUCK	12 2.7%						50 3.4%			62 3.2%		
BOTH	442 23.1%						1469 76.9%			1911 100.0%		

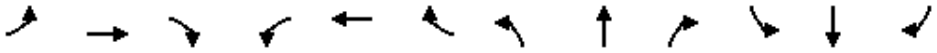
DIRECTION OF TRAVEL : EASTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM	34	2	36	275	15	290				309	17	326
7:00 AM - 8:00 AM	82	12	94	584	41	625				666	53	719
8:00 AM - 9:00 AM	71	3	74	554	89	643				625	92	717
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM	51	2	53	453	61	514				504	63	567
11:00 AM - 12:00 PM	60	6	66	506	64	570				566	70	636
12:00 PM - 1:00 PM	76	6	82	549	49	598				625	55	680
1:00 PM - 2:00 PM	90	3	93	574	64	638				664	67	731
2:00 PM - 3:00 PM	103	10	113	580	67	647				683	77	760
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM	144	5	149	648	60	708				792	65	857
4:00 PM - 5:00 PM	244	2	246	699	43	742				943	45	988
5:00 PM - 6:00 PM	294	5	299	773	21	794				1067	26	1093
6:00 PM - 7:00 PM	173	1	174	655	13	668				828	14	842
PASSENGER	1422 96.1%			6850 92.1%						8272 92.8%		
TRUCK	57 3.9%			587 7.9%						644 7.2%		
BOTH	1479 16.6%			7437 83.4%						8916 100.0%		

DIRECTION OF TRAVEL : WESTBOUND

HOUR	LEFT			THROUGH			RIGHT			TOTAL		
AM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
6:00 AM - 7:00 AM				456	21	477	9	2	11	465	23	488
7:00 AM - 8:00 AM				720	59	779	27	3	30	747	62	809
8:00 AM - 9:00 AM				644	58	702	20	6	26	664	64	728
OFF TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
10:00 AM - 11:00 AM				429	53	482	24	3	27	453	56	509
11:00 AM - 12:00 PM				493	37	530	41	5	46	534	42	576
12:00 PM - 1:00 PM				553	70	623	52	2	54	605	72	677
1:00 PM - 2:00 PM				552	66	618	48	2	50	600	68	668
2:00 PM - 3:00 PM				615	67	682	52	1	53	667	68	735
PM TIME PERIOD	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH	PASS	TRUCK	BOTH
3:00 PM - 4:00 PM				636	52	688	62	5	67	698	57	755
4:00 PM - 5:00 PM				703	30	733	86	2	88	789	32	821
5:00 PM - 6:00 PM				731	21	752	115	2	117	846	23	869
6:00 PM - 7:00 PM				528	14	542	88	0	88	616	14	630
PASSENGER				7060 92.8%			624 95.0%			7684 93.0%		
TRUCK				548 7.2%			33 5.0%			581 7.0%		
BOTH				7608 92.1%			657 7.9%			8265 100.0%		

Release 11-18-04



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	450	310	5	690	30	220	20	5	30	20	340
Future Volume (veh/h)	110	450	310	5	690	30	220	20	5	30	20	340
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	120	489	337	5	750	33	239	22	5	33	22	370
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	873	740	304	873	740	280	541	123	614	33	553
Arrive On Green	0.47	0.47	0.47	0.47	0.47	0.47	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	691	1870	1585	663	1870	1585	992	1475	335	1383	90	1509
Grp Volume(v), veh/h	120	489	337	5	750	33	239	0	27	33	0	392
Grp Sat Flow(s),veh/h/ln	691	1870	1585	663	1870	1585	992	0	1810	1383	0	1599
Q Serve(g_s), s	6.6	11.3	8.6	0.3	21.4	0.7	9.7	0.0	0.6	0.9	0.0	12.3
Cycle Q Clear(g_c), s	28.0	11.3	8.6	11.7	21.4	0.7	22.0	0.0	0.6	1.5	0.0	12.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.19	1.00		0.94
Lane Grp Cap(c), veh/h	196	873	740	304	873	740	280	0	664	614	0	586
V/C Ratio(X)	0.61	0.56	0.46	0.02	0.86	0.04	0.85	0.00	0.04	0.05	0.00	0.67
Avail Cap(c_a), veh/h	196	873	740	304	873	740	280	0	664	614	0	586
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.9	11.6	10.8	15.8	14.2	8.7	26.8	0.0	12.2	12.7	0.0	15.9
Incr Delay (d2), s/veh	5.6	0.8	0.4	0.0	8.6	0.0	21.9	0.0	0.0	0.0	0.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	4.2	2.7	0.0	9.6	0.2	5.0	0.0	0.2	0.3	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	12.4	11.3	15.8	22.9	8.7	48.7	0.0	12.2	12.7	0.0	18.9
LnGrp LOS	C	B	B	B	C	A	D	A	B	B	A	B
Approach Vol, veh/h		946			788			266			425	
Approach Delay, s/veh		14.7			22.2			45.0			18.4	
Approach LOS		B			C			D			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	27.0	33.0	27.0	33.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	22.0	28.0	22.0	28.0
Max Q Clear Time (g_c+I1), s	24.0	30.0	14.3	23.4
Green Ext Time (p_c), s	0.0	0.0	1.6	2.2

Intersection Summary	
HCM 6th Ctrl Delay	21.1
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	560	380	5	580	60	260	80	5	30	30	160
Future Volume (veh/h)	360	560	380	5	580	60	260	80	5	30	30	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	391	609	413	5	630	65	283	87	5	33	33	174
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	359	1075	911	294	1075	911	322	525	30	434	78	410
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	750	1870	1585	552	1870	1585	1175	1752	101	1304	259	1366
Grp Volume(v), veh/h	391	609	413	5	630	65	283	0	92	33	0	207
Grp Sat Flow(s),veh/h/ln	750	1870	1585	552	1870	1585	1175	0	1852	1304	0	1625
Q Serve(g_s), s	28.7	16.4	12.0	0.5	17.3	1.5	15.8	0.0	2.9	1.5	0.0	8.2
Cycle Q Clear(g_c), s	46.0	16.4	12.0	16.9	17.3	1.5	24.0	0.0	2.9	4.5	0.0	8.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.05	1.00		0.84
Lane Grp Cap(c), veh/h	359	1075	911	294	1075	911	322	0	556	434	0	487
V/C Ratio(X)	1.09	0.57	0.45	0.02	0.59	0.07	0.88	0.00	0.17	0.08	0.00	0.42
Avail Cap(c_a), veh/h	359	1075	911	294	1075	911	322	0	556	434	0	487
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.2	10.7	9.8	16.0	10.9	7.5	33.5	0.0	20.6	22.3	0.0	22.5
Incr Delay (d2), s/veh	73.3	0.7	0.4	0.0	0.8	0.0	22.9	0.0	0.1	0.1	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.2	6.1	3.7	0.1	6.5	0.5	7.5	0.0	1.2	0.5	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	102.5	11.4	10.1	16.1	11.7	7.6	56.4	0.0	20.8	22.3	0.0	23.0
LnGrp LOS	F	B	B	B	B	A	E	A	C	C	A	C
Approach Vol, veh/h		1413			700			375			240	
Approach Delay, s/veh		36.3			11.4			47.7			23.0	
Approach LOS		D			B			D			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	29.0	51.0	29.0	51.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	24.0	46.0	24.0	46.0
Max Q Clear Time (g_c+I1), s	26.0	48.0	10.2	19.3
Green Ext Time (p_c), s	0.0	0.0	1.1	5.0

Intersection Summary	
HCM 6th Ctrl Delay	30.3
HCM 6th LOS	C

LANE SUMMARY

Site: 1 [SR 32 & Hague Road AM Peak - Two-Lane RAB]

SR 32 & Hague Road AM Peak - Two-Lane RAB
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Pleasant Street													
Lane 1[d]	239	2.0	798	0.300	100	7.9	LOS A	1.2	30.5	Full	1600	0.0	0.0
Lane 2	27	2.0	725	0.037	13[5]	5.3	LOS A	0.1	3.3	Full	1600	0.0	0.0
Approach	266	2.0		0.300		7.7	LOS A	1.2	30.5				
East: SR 32													
Lane 1	379	2.0	926	0.409	100	8.6	LOS A	2.0	50.4	Full	1600	0.0	0.0
Lane 2[d]	409	2.0	1001	0.409	100	8.1	LOS A	2.0	49.9	Full	1600	0.0	0.0
Approach	788	2.0		0.409		8.3	LOS A	2.0	50.4				
North: Hague Road													
Lane 1	54	2.0	520	0.104	17[5]	8.2	LOS A	0.4	9.0	Full	1600	0.0	0.0
Lane 2[d]	370	2.0	588	0.629	100	19.1	LOS B	4.1	104.1	Full	1600	0.0	0.0
Approach	424	2.0		0.629		17.7	LOS B	4.1	104.1				
West: SR 32													
Lane 1	460	2.0	1251	0.368	100	6.4	LOS A	2.0	51.1	Full	1600	0.0	0.0
Lane 2[d]	486	2.0	1322	0.368	100	6.1	LOS A	2.0	49.8	Full	1600	0.0	0.0
Approach	946	2.0		0.368		6.3	LOS A	2.0	51.1				
Intersection	2424	2.0		0.629		9.1	LOS A	4.1	104.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 30, 2018 2:54:46 PM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\SR 32 & Hague Street\SR 32 & Hague Road.sip8

LANE SUMMARY

Site: 1 [SR 32 & Hague Road PM Peak - Two-Lane RAB]

SR 32 & Hague Road AM Peak - Two-Lane RAB
Site Category: (None)
Roundabout

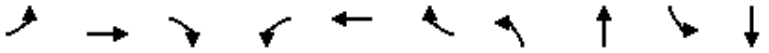
Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Pleasant Street													
Lane 1[d]	283	2.0	569	0.497	100	14.9	LOS B	2.6	65.0	Full	1600	0.0	0.0
Lane 2	92	2.0	502	0.184	37[5]	9.7	LOS A	0.6	16.2	Full	1600	0.0	0.0
Approach	375	2.0		0.497		13.6	LOS B	2.6	65.0				
East: SR 32													
Lane 1	332	2.0	648	0.513	100	13.8	LOS B	3.1	77.7	Full	1600	0.0	0.0
Lane 2[d]	369	2.0	720	0.513	100	12.7	LOS B	3.1	78.8	Full	1600	0.0	0.0
Approach	701	2.0		0.513		13.2	LOS B	3.1	78.8				
North: Hague Road													
Lane 1	65	2.0	559	0.117	42[5]	7.9	LOS A	0.4	10.2	Full	1600	0.0	0.0
Lane 2[d]	174	2.0	628	0.277	100	9.3	LOS A	1.0	26.1	Full	1600	0.0	0.0
Approach	239	2.0		0.277		8.9	LOS A	1.0	26.1				
West: SR 32													
Lane 1	687	2.0	1239	0.555	100	9.2	LOS A	4.1	103.5	Full	1600	0.0	0.0
Lane 2[d]	726	2.0	1309	0.555	100	8.9	LOS A	4.0	101.2	Full	1600	0.0	0.0
Approach	1413	2.0		0.555		9.1	LOS A	4.1	103.5				
Intersection	2728	2.0		0.555		10.7	LOS B	4.1	103.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

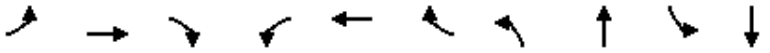
Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 30, 2018 3:00:49 PM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\SR 32 & Hague Street\SR 32 & Hague Road.sip8



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	120	489	337	5	750	33	239	27	33	392
v/c Ratio	0.90	0.55	0.36	0.02	0.85	0.04	0.94	0.04	0.07	0.60
Control Delay	81.0	14.3	2.6	8.8	25.7	3.5	65.7	11.0	12.9	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.0	14.3	2.6	8.8	25.7	3.5	65.7	11.0	12.9	14.6
Queue Length 50th (ft)	38	120	0	1	227	0	79	5	8	70
Queue Length 95th (ft)	#132	200	36	6	#432	11	#202	18	23	148
Internal Link Dist (ft)		2918			652			1286		3234
Turn Bay Length (ft)	200			350			150		150	
Base Capacity (vph)	133	887	930	331	887	772	270	681	515	679
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
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	0.90	0.55	0.36	0.02	0.85	0.04	0.89	0.04	0.06	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	391	609	413	5	630	65	283	92	33	207
v/c Ratio	0.95	0.56	0.38	0.01	0.88	0.09	1.01	0.23	0.12	0.64
Control Delay	54.0	14.4	2.5	7.8	39.7	0.2	86.7	28.5	22.1	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	14.4	2.5	7.8	39.7	0.2	86.7	28.5	22.1	18.1
Queue Length 50th (ft)	132	152	0	1	279	0	~124	34	12	15
Queue Length 95th (ft)	#343	386	48	6	#537	0	#245	83	32	77
Internal Link Dist (ft)		2918			676			1286		3234
Turn Bay Length (ft)	200			350			150		150	
Base Capacity (vph)	413	1092	1098	435	721	717	279	486	282	500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
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	0.95	0.56	0.38	0.01	0.87	0.09	1.01	0.19	0.12	0.41

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

QUEUE DISTANCE (%ILE)

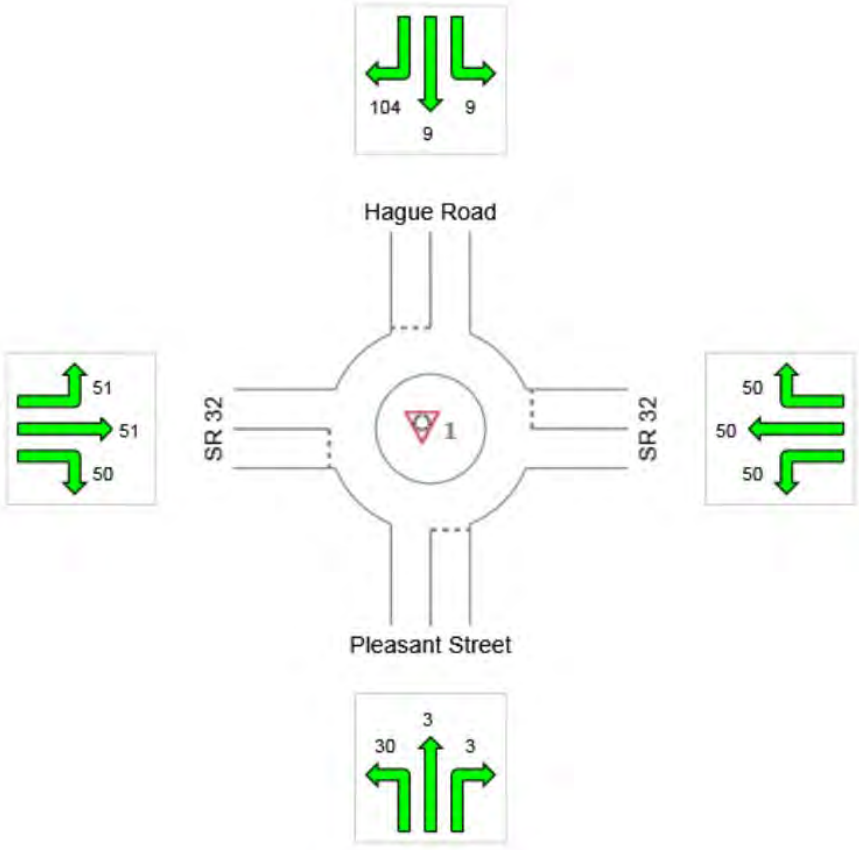
Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

Site: 1 [SR 32 & Hague Road AM Peak - Two-Lane RAB]

SR 32 & Hague Road AM Peak - Two-Lane RAB
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Vehicle Queue (%ile)	30	50	104	51	104



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

Organisation: A&F ENGINEERING CO., LLC | Processed: Tuesday, October 30, 2018 2:54:46 PM
Project: Z:\2017\17068S - Noblesville, Traffic, Pleasant St. Bridge\SIDRA\SR 32 & Hague Street\SR 32 & Hague Road.sip8

QUEUE DISTANCE (%ILE)

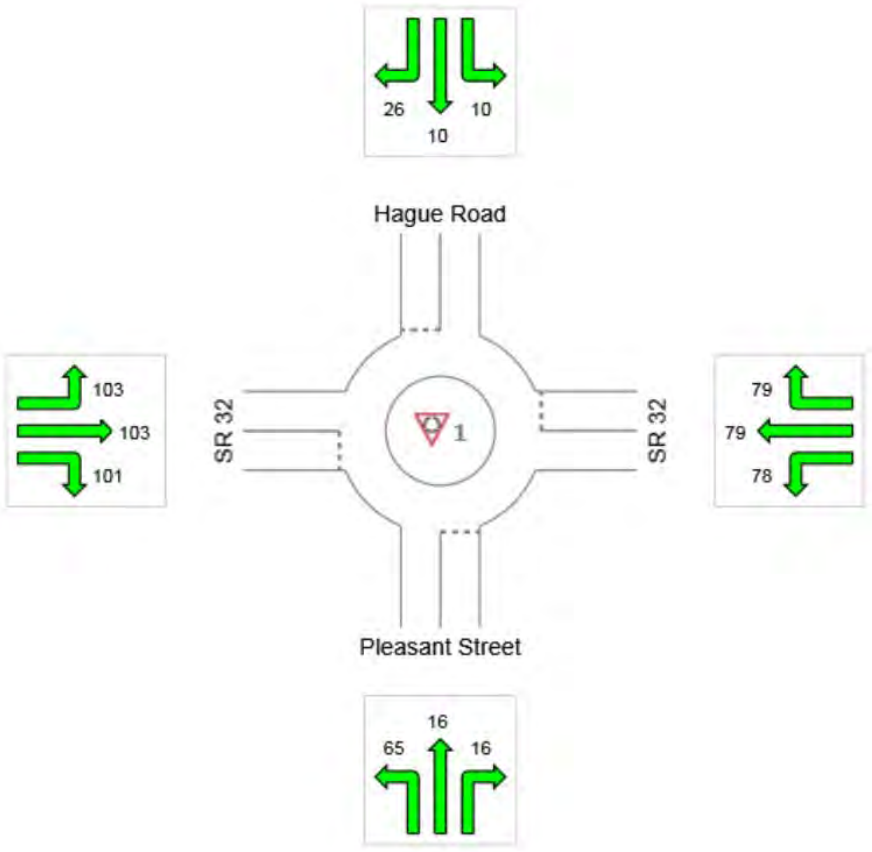
Largest 95% Back of Queue Distance for any lane used by vehicle movement (feet)

Site: 1 [SR 32 & Hague Road PM Peak - Two-Lane RAB]

SR 32 & Hague Road AM Peak - Two-Lane RAB
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Vehicle Queue (%ile)	65	79	26	103	103



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

24-HOUR TRAFFIC VOLUME COUNTS

SR 32 & HAGUE RD - TMC
Wed Sep 6, 2017
Full Length (1PM-1PM (+1))
All Classes (Lights and Motorcycles, Heavy)
All Movements
ID: 443718, Location: 40.043568, -86.039659

Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg	North				West				East				
Direction	Southbound				Eastbound				Westbound				
Time	L	R	U	App	L	T	U	App	T	R	U	App	Int
2017-09-06 1:00PM	42	85	0	**127**	93	638	0	**731**	618	50	0	**668**	**1526**
2:00PM	35	90	0	**125**	113	647	0	**760**	682	53	0	**735**	**1620**
3:00PM	30	90	0	**120**	149	708	0	**857**	688	67	0	**755**	**1732**
4:00PM	49	126	0	**175**	246	742	0	**988**	733	88	0	**821**	**1984**
5:00PM	41	139	0	**180**	299	794	0	**1093**	752	117	0	**869**	**2142**
6:00PM	46	138	0	**184**	174	668	0	**842**	542	88	0	**630**	**1656**
7:00PM	34	88	0	**122**	128	467	0	**595**	426	72	0	**498**	**1215**
8:00PM	25	70	0	**95**	90	317	0	**407**	359	53	0	**412**	**914**
9:00PM	8	33	0	**41**	61	177	0	**238**	247	26	0	**273**	**552**
10:00PM	6	12	0	**18**	30	77	0	**107**	96	6	0	**102**	**227**
11:00PM	5	8	1	**14**	15	59	0	**74**	54	5	0	**59**	**147**
2017-09-07 12:00AM	2	7	0	**9**	9	37	0	**46**	29	2	0	**31**	**86**
1:00AM	0	2	0	**2**	4	11	0	**15**	16	0	0	**16**	**33**
2:00AM	0	2	0	**2**	2	10	0	**12**	16	0	0	**16**	**30**
3:00AM	1	2	0	**3**	2	17	0	**19**	22	3	0	**25**	**47**
4:00AM	1	19	0	**20**	3	35	0	**38**	50	0	0	**50**	**108**
5:00AM	6	45	0	**51**	7	100	0	**107**	139	2	0	**141**	**299**
6:00AM	12	142	0	**154**	36	290	0	**326**	477	11	0	**488**	**968**
7:00AM	41	257	1	**299**	94	625	0	**719**	779	30	0	**809**	**1827**
8:00AM	43	161	0	**204**	74	643	0	**717**	702	26	0	**728**	**1649**
9:00AM	29	94	0	**123**	59	542	0	**601**	542	37	0	**579**	**1303**
10:00AM	28	74	0	**102**	53	514	0	**567**	482	27	0	**509**	**1178**
11:00AM	38	80	0	**118**	66	570	0	**636**	530	46	0	**576**	**1330**
12:00PM	36	87	0	**123**	82	598	0	**680**	623	54	0	**677**	**1480**
Total	558	1851	2	**2411**	1889	9286	0	**11175**	9604	863	0	**10467**	**24053**
% Approach	23.1%	76.8%	0.1%	-	16.9%	83.1%	0%	-	91.8%	8.2%	0%	-	-
% Total	2.3%	7.7%	0%	**10.0%**	7.9%	38.6%	0%	**46.5%**	39.9%	3.6%	0%	**43.5%**	-
Lights and Motorcycles	541	1793	2	**2336**	1826	8593	0	**10419**	8975	826	0	**9801**	22556
% Lights and Motorcycles	97.0%	96.9%	100%	**96.9%**	96.7%	92.5%	0%	**93.2%**	93.5%	95.7%	0%	**93.6%**	93.8%
Heavy	17	58	0	**75**	63	693	0	**756**	629	37	0	**666**	1497
% Heavy	3.0%	3.1%	0%	**3.1%**	3.3%	7.5%	0%	**6.8%**	6.5%	4.3%	0%	**6.4%**	6.2%

*L: Left, R: Right, T: Thru, U: U-Turn

SR 32 & CHERRY TREE RD - TMC
Wed Sep 6, 2017
Full Length (12PM-12PM (+1))
All Classes (Lights and Motorcycles, Heavy)
All Movements
ID: 443717, Location: 40.044999, -86.035065

Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg	South				West				East				
Direction	Northbound				Eastbound				Westbound				
Time	L	R	U	App	T	R	U	App	L	T	U	App	Int
2017-09-06 12:00PM	4	50	0	**54**	606	6	0	**612**	31	658	0	**689**	**1355**
1:00PM	5	63	0	**68**	674	6	0	**680**	53	671	0	**724**	**1472**
2:00PM	5	62	0	**67**	673	8	0	**681**	48	739	1	**788**	**1536**
3:00PM	3	60	0	**63**	733	6	0	**739**	65	747	0	**812**	**1614**
4:00PM	5	88	0	**93**	767	18	0	**785**	67	806	0	**873**	**1751**
5:00PM	3	102	0	**105**	803	12	0	**815**	79	850	0	**929**	**1849**
6:00PM	11	102	0	**113**	712	12	0	**724**	57	619	0	**676**	**1513**
7:00PM	5	48	0	**53**	486	3	0	**489**	53	490	1	**544**	**1086**
8:00PM	5	29	0	**34**	332	7	0	**339**	62	397	0	**459**	**832**
9:00PM	2	11	0	**13**	179	2	0	**181**	16	268	0	**284**	**478**
10:00PM	0	5	0	**5**	84	0	0	**84**	8	105	0	**113**	**202**
11:00PM	0	1	0	**1**	62	0	0	**62**	6	54	0	**60**	**123**
2017-09-07 12:00AM	0	0	0	**0**	37	1	0	**38**	2	31	0	**33**	**71**
1:00AM	0	2	0	**2**	9	0	0	**9**	1	15	0	**16**	**27**
2:00AM	0	0	0	**0**	11	0	0	**11**	0	17	0	**17**	**28**
3:00AM	2	2	0	**4**	17	0	0	**17**	6	25	0	**31**	**52**
4:00AM	0	1	0	**1**	37	0	0	**37**	3	51	0	**54**	**92**
5:00AM	0	3	0	**3**	107	0	0	**107**	1	146	0	**147**	**257**
6:00AM	0	28	0	**28**	310	3	0	**313**	22	497	0	**519**	**860**
7:00AM	4	78	0	**82**	662	6	0	**668**	24	816	0	**840**	**1590**
8:00AM	3	59	0	**62**	675	5	0	**680**	28	702	1	**731**	**1473**
9:00AM	2	40	0	**42**	558	5	0	**563**	29	575	0	**604**	**1209**
10:00AM	4	38	0	**42**	527	8	0	**535**	31	506	0	**537**	**1114**
11:00AM	3	56	0	**59**	595	3	0	**598**	33	577	0	**610**	**1267**
Total	66	928	0	**994**	9656	111	0	**9767**	725	10362	3	**11090**	**21851**
% Approach	6.6%	93.4%	0%	-	98.9%	1.1%	0%	-	6.5%	93.4%	0%	-	-
% Total	0.3%	4.2%	0%	**4.5%**	44.2%	0.5%	0%	**44.7%**	3.3%	47.4%	0%	**50.8%**	-
Lights and Motorcycles	65	905	0	**970**	8977	106	0	**9083**	709	9641	3	**10353**	20406
% Lights and Motorcycles	98.5%	97.5%	0%	**97.6%**	93.0%	95.5%	0%	**93.0%**	97.8%	93.0%	100%	**93.4%**	93.4%
Heavy	1	23	0	**24**	679	5	0	**684**	16	721	0	**737**	1445
% Heavy	1.5%	2.5%	0%	**2.4%**	7.0%	4.5%	0%	**7.0%**	2.2%	7.0%	0%	**6.6%**	6.6%

*L: Left, R: Right, T: Thru, U: U-Turn

SR 32 & River Rd - TMC
Wed Sep 6, 2017
Full Length (12PM-12PM (+1))
All Classes (Lights and Motorcycles, Heavy)
All Movements
ID: 443656, Location: 40.047009, -86.028038

Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg	South					North					West					East					
Direction	Northbound					Southbound					Eastbound					Westbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2017-09-06 12:00PM	117	93	104	0	**314**	53	73	65	0	**191**	42	540	72	0	**654**	100	540	47	0	**687**	**1846**
1:00PM	106	81	102	0	**289**	48	98	61	0	**207**	55	593	71	0	**719**	83	555	39	0	**677**	**1892**
2:00PM	125	97	103	0	**325**	43	104	61	0	**208**	51	594	71	0	**716**	89	606	39	0	**734**	**1983**
3:00PM	133	121	135	0	**389**	47	122	79	0	**248**	46	640	63	0	**749**	106	572	27	0	**705**	**2091**
4:00PM	136	124	152	0	**412**	59	122	84	0	**265**	69	669	69	0	**807**	116	653	11	0	**780**	**2264**
5:00PM	142	139	193	0	**474**	52	133	103	0	**288**	50	720	54	0	**824**	111	650	28	0	**789**	**2375**
6:00PM	111	78	115	0	**304**	43	98	63	0	**204**	41	722	46	0	**809**	63	507	28	0	**598**	**1915**
7:00PM	72	48	68	0	**188**	22	44	24	0	**90**	31	507	39	0	**577**	88	425	15	0	**528**	**1383**
8:00PM	40	44	39	0	**123**	22	40	26	0	**88**	14	302	38	0	**354**	66	359	17	0	**442**	**1007**
9:00PM	20	38	28	0	**86**	8	29	9	0	**46**	7	185	18	0	**210**	50	244	7	0	**301**	**643**
10:00PM	17	17	19	0	**53**	2	21	3	0	**26**	6	82	15	0	**103**	38	86	3	0	**127**	**309**
11:00PM	5	15	7	0	**27**	2	13	7	0	**22**	4	52	12	0	**68**	18	48	0	0	**66**	**183**
2017-09-07 12:00AM	1	8	7	0	**16**	1	3	0	0	**4**	1	32	2	0	**35**	9	32	3	0	**44**	**99**
1:00AM	0	3	5	0	**8**	0	2	0	0	**2**	0	13	0	0	**13**	5	16	0	0	**21**	**44**
2:00AM	3	5	5	0	**13**	1	3	1	0	**5**	0	9	1	0	**10**	4	14	0	0	**18**	**46**
3:00AM	4	2	1	0	**7**	0	4	5	0	**9**	0	14	3	0	**17**	5	18	3	0	**26**	**59**
4:00AM	1	3	6	0	**10**	1	5	2	0	**8**	4	30	0	0	**34**	9	52	3	0	**64**	**116**
5:00AM	9	15	20	0	**44**	2	24	8	0	**34**	0	87	13	0	**100**	23	125	5	0	**153**	**331**
6:00AM	37	17	54	0	**108**	12	86	30	0	**128**	3	269	23	0	**295**	52	434	6	0	**492**	**1023**
7:00AM	77	71	99	0	**247**	12	130	69	0	**211**	20	638	56	0	**714**	91	688	28	0	**807**	**1979**
8:00AM	70	73	84	0	**227**	22	135	71	0	**228**	44	552	65	0	**661**	70	587	27	0	**684**	**1800**
9:00AM	87	69	88	0	**244**	42	76	54	0	**172**	31	507	56	0	**594**	65	469	28	0	**562**	**1572**
10:00AM	58	71	108	0	**237**	37	70	45	0	**152**	28	477	59	0	**564**	78	451	39	0	**568**	**1521**
11:00AM	102	84	100	0	**286**	69	77	53	0	**199**	33	551	54	0	**638**	78	457	42	0	**577**	**1700**
Total	1473	1316	1642	0	**4431**	600	1512	923	0	**3035**	580	8785	900	0	**10265**	1417	8588	445	0	**10450**	**28181**
% Approach	33.2%	29.7%	37.1%	0%	-	19.8%	49.8%	30.4%	0%	-	5.7%	85.6%	8.8%	0%	-	13.6%	82.2%	4.3%	0%	-	-
% Total	5.2%	4.7%	5.8%	0%	**15.7%**	2.1%	5.4%	3.3%	0%	**10.8%**	2.1%	31.2%	3.2%	0%	**36.4%**	5.0%	30.5%	1.6%	0%	**37.1%**	-
Lights and Motorcycles	1205	1188	1536	0	**3929**	585	1370	905	0	**2860**	567	8352	655	0	**9574**	1330	8183	429	0	**9942**	26305
% Lights and Motorcycles	81.8%	90.3%	93.5%	0%	**88.7%**	97.5%	90.6%	98.0%	0%	**94.2%**	97.8%	95.1%	72.8%	0%	**93.3%**	93.9%	95.3%	96.4%	0%	**95.1%**	93.3%
Heavy	268	128	106	0	**502**	15	142	18	0	**175**	13	433	245	0	**691**	87	405	16	0	**508**	1876
% Heavy	18.2%	9.7%	6.5%	0%	**11.3%**	2.5%	9.4%	2.0%	0%	**5.8%**	2.2%	4.9%	27.2%	0%	**6.7%**	6.1%	4.7%	3.6%	0%	**4.9%**	6.7%

*L: Left, R: Right, T: Thru, U: U-Turn

SR 32/38 & HWY 19 - TMC
Tue Sep 12, 2017
Full Length (1PM-1PM (+1))
All Classes (Lights and Motorcycles, Heavy)
All Movements
ID: 445349, Location: 40.046498, -86.01887

Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg	North				West				East				
Direction	Southbound				Eastbound				Westbound				
Time	L	R	U	App	L	T	U	App	T	R	U	App	Int
2017-09-12 1:00PM	76	95	0	**171**	104	805	0	**909**	866	37	0	**903**	**1983**
2:00PM	47	116	0	**163**	134	914	0	**1048**	897	47	0	**944**	**2155**
3:00PM	68	105	0	**173**	168	953	0	**1121**	840	44	0	**884**	**2178**
4:00PM	60	116	0	**176**	234	1161	0	**1395**	970	59	0	**1029**	**2600**
5:00PM	52	119	0	**171**	226	1182	0	**1408**	971	41	0	**1012**	**2591**
6:00PM	64	84	0	**148**	191	913	0	**1104**	797	39	0	**836**	**2088**
7:00PM	33	80	0	**113**	119	574	0	**693**	673	34	0	**707**	**1513**
8:00PM	31	52	0	**83**	80	399	0	**479**	586	28	0	**614**	**1176**
9:00PM	24	51	0	**75**	49	197	0	**246**	353	15	0	**368**	**689**
10:00PM	9	22	0	**31**	27	132	0	**159**	171	4	0	**175**	**365**
11:00PM	7	11	0	**18**	16	78	0	**94**	85	3	0	**88**	**200**
2017-09-13 12:00AM	2	1	0	**3**	12	40	0	**52**	51	2	0	**53**	**108**
1:00AM	3	4	0	**7**	3	36	0	**39**	33	2	0	**35**	**81**
2:00AM	2	1	0	**3**	4	25	0	**29**	26	0	0	**26**	**58**
3:00AM	1	8	0	**9**	5	30	0	**35**	32	0	0	**32**	**76**
4:00AM	7	24	0	**31**	3	69	0	**72**	81	1	0	**82**	**185**
5:00AM	25	46	0	**71**	17	196	0	**213**	211	5	0	**216**	**500**
6:00AM	54	128	0	**182**	72	477	0	**549**	591	17	0	**608**	**1339**
7:00AM	140	245	0	**385**	157	834	0	**991**	858	30	0	**888**	**2264**
8:00AM	106	181	0	**287**	117	807	0	**924**	837	20	0	**857**	**2068**
9:00AM	81	112	0	**193**	75	803	0	**878**	693	45	0	**738**	**1809**
10:00AM	74	63	0	**137**	87	757	0	**844**	685	39	0	**724**	**1705**
11:00AM	63	84	0	**147**	104	830	0	**934**	766	26	0	**792**	**1873**
12:00PM	81	86	0	**167**	116	843	0	**959**	805	49	0	**854**	**1980**
Total	1110	1834	0	**2944**	2120	13055	0	**15175**	12878	587	0	**13465**	**31584**
% Approach	37.7%	62.3%	0%	-	14.0%	86.0%	0%	-	95.6%	4.4%	0%	-	-
% Total	3.5%	5.8%	0%	**9.3%**	6.7%	41.3%	0%	**48.0%**	40.8%	1.9%	0%	**42.6%**	-
Lights and Motorcycles	1072	1722	0	**2794**	1995	12403	0	**14398**	12262	562	0	**12824**	30016
% Lights and Motorcycles	96.6%	93.9%	0%	**94.9%**	94.1%	95.0%	0%	**94.9%**	95.2%	95.7%	0%	**95.2%**	95.0%
Heavy	38	112	0	**150**	125	652	0	**777**	616	25	0	**641**	1568
% Heavy	3.4%	6.1%	0%	**5.1%**	5.9%	5.0%	0%	**5.1%**	4.8%	4.3%	0%	**4.8%**	5.0%

*L: Left, R: Right, T: Thru, U: U-Turn

SR 32/38 & 8TH ST - TMC
Tue Sep 12, 2017
Full Length (1PM-1PM (+1))
All Classes (Lights and Motorcycles, Heavy)
All Movements
ID: 445421, Location: 40.045623, -86.014715

Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg Direction	South Northbound					North Southbound					West Eastbound					East Westbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2017-09-12 1:00PM	254	178	11	0	**443**	35	158	23	0	**216**	13	480	373	0	**866**	12	631	54	0	**697**	**2222**
2:00PM	281	180	19	0	**480**	19	129	29	0	**177**	15	527	391	0	**933**	11	647	36	0	**694**	**2284**
3:00PM	269	188	10	0	**467**	25	175	29	0	**229**	17	533	454	0	**1004**	8	580	41	0	**629**	**2329**
4:00PM	302	248	13	0	**563**	27	194	22	0	**243**	17	634	552	0	**1203**	10	679	36	0	**725**	**2734**
5:00PM	319	275	9	0	**603**	20	187	13	0	**220**	16	645	580	0	**1241**	6	695	22	1	**724**	**2788**
6:00PM	275	184	9	0	**468**	21	134	4	0	**159**	14	560	394	0	**968**	2	566	29	0	**597**	**2192**
7:00PM	223	120	4	0	**347**	16	80	7	0	**103**	5	349	249	0	**603**	10	472	24	0	**506**	**1559**
8:00PM	198	99	2	0	**299**	13	53	7	0	**73**	7	253	158	0	**418**	5	415	16	0	**436**	**1226**
9:00PM	117	47	3	0	**167**	6	36	4	0	**46**	0	135	78	0	**213**	4	245	11	0	**260**	**686**
10:00PM	60	26	2	0	**88**	1	9	1	0	**11**	2	82	46	0	**130**	2	111	3	0	**116**	**345**
11:00PM	29	12	2	0	**43**	3	9	2	0	**14**	1	57	24	0	**82**	1	54	2	0	**57**	**196**
2017-09-13 12:00AM	17	7	1	0	**25**	0	6	0	0	**6**	1	25	14	0	**40**	1	35	0	0	**36**	**107**
1:00AM	11	2	0	0	**13**	0	3	0	0	**3**	0	24	12	0	**36**	0	23	2	0	**25**	**77**
2:00AM	6	2	0	0	**8**	0	0	0	0	**0**	1	14	12	0	**27**	0	18	0	0	**18**	**53**
3:00AM	6	0	0	0	**6**	0	4	1	0	**5**	0	20	11	0	**31**	1	25	1	0	**27**	**69**
4:00AM	26	2	1	0	**29**	0	6	0	0	**6**	0	30	49	0	**79**	0	54	0	0	**54**	**168**
5:00AM	52	7	3	0	**62**	2	37	0	0	**39**	0	106	113	0	**219**	5	172	1	0	**178**	**498**
6:00AM	152	45	4	0	**201**	5	84	3	0	**92**	1	233	277	0	**511**	4	454	3	0	**461**	**1265**
7:00AM	220	118	8	0	**346**	15	199	10	0	**224**	9	478	382	0	**869**	5	682	15	0	**702**	**2141**
8:00AM	228	139	6	0	**373**	22	195	14	0	**231**	20	437	439	0	**896**	3	629	27	0	**659**	**2159**
9:00AM	192	90	15	0	**297**	23	127	29	0	**179**	18	477	378	0	**873**	5	549	62	0	**616**	**1965**
10:00AM	216	105	16	0	**337**	31	120	12	0	**163**	18	496	341	0	**855**	10	498	28	0	**536**	**1891**
11:00AM	243	102	23	0	**368**	26	134	14	0	**174**	17	478	363	0	**858**	8	542	23	0	**573**	**1973**
12:00PM	254	142	20	0	**416**	36	149	23	0	**208**	28	503	383	0	**914**	15	589	70	0	**674**	**2212**
Total	3950	2318	181	0	**6449**	346	2228	247	0	**2821**	220	7576	6073	0	**13869**	128	9365	506	1	**10000**	**33139**
% Approach	61.2%	35.9%	2.8%	0%	-	12.3%	79.0%	8.8%	0%	-	1.6%	54.6%	43.8%	0%	-	1.3%	93.7%	5.1%	0%	-	-
% Total	11.9%	7.0%	0.5%	0%	**19.5%**	1.0%	6.7%	0.7%	0%	**8.5%**	0.7%	22.9%	18.3%	0%	**41.9%**	0.4%	28.3%	1.5%	0%	**30.2%**	-
Lights and Motorcycles	3814	2284	170	0	**6268**	334	2188	244	0	**2766**	218	7055	5924	0	**13197**	120	8854	503	1	**9478**	31709
% Lights and Motorcycles	96.6%	98.5%	93.9%	0%	**97.2%**	96.5%	98.2%	98.8%	0%	**98.1%**	99.1%	93.1%	97.5%	0%	**95.2%**	93.8%	94.5%	99.4%	100%	**94.8%**	95.7%
Heavy	136	34	11	0	**181**	12	40	3	0	**55**	2	521	149	0	**672**	8	511	3	0	**522**	1430
% Heavy	3.4%	1.5%	6.1%	0%	**2.8%**	3.5%	1.8%	1.2%	0%	**1.9%**	0.9%	6.9%	2.5%	0%	**4.8%**	6.3%	5.5%	0.6%	0%	**5.2%**	4.3%

*L: Left, R: Right, T: Thru, U: U-Turn

SR 32/38 & 14TH ST - TMC
Tue Sep 26, 2017
Full Length (1PM-1PM (+1))
All Classes (Lights and Motorcycles, Heavy)
All Movements
ID: 451888, Location: 40.045683, -86.007614

Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg	North				West				East				
Direction	Southbound				Eastbound				Westbound				
Time	L	R	U	App	L	T	U	App	T	R	U	App	Int
2017-09-26 1:00PM	4	1	0	**5**	2	521	0	**523**	528	4	0	**532**	**1060**
2:00PM	2	3	0	**5**	7	573	0	**580**	544	5	0	**549**	**1134**
3:00PM	1	4	0	**5**	12	601	0	**613**	567	4	0	**571**	**1189**
4:00PM	3	1	0	**4**	20	540	0	**560**	486	13	0	**499**	**1063**
5:00PM	1	1	0	**2**	19	635	0	**654**	508	11	0	**519**	**1175**
6:00PM	3	3	0	**6**	11	521	0	**532**	486	14	0	**500**	**1038**
7:00PM	0	5	0	**5**	5	397	0	**402**	379	4	0	**383**	**790**
8:00PM	3	1	0	**4**	0	281	0	**281**	348	3	0	**351**	**636**
9:00PM	1	1	0	**2**	4	198	0	**202**	236	0	0	**236**	**440**
10:00PM	0	0	0	**0**	0	110	0	**110**	115	1	0	**116**	**226**
11:00PM	0	0	0	**0**	0	65	0	**65**	64	0	0	**64**	**129**
2017-09-27 12:00AM	1	0	0	**1**	0	33	0	**33**	23	0	0	**23**	**57**
1:00AM	0	0	0	**0**	0	25	0	**25**	23	0	0	**23**	**48**
2:00AM	0	0	0	**0**	0	18	0	**18**	10	0	0	**10**	**28**
3:00AM	1	0	0	**1**	0	19	0	**19**	20	0	0	**20**	**40**
4:00AM	0	0	0	**0**	0	33	0	**33**	64	0	0	**64**	**97**
5:00AM	2	1	0	**3**	0	98	0	**98**	162	0	0	**162**	**263**
6:00AM	0	1	0	**1**	0	231	0	**231**	434	1	0	**435**	**667**
7:00AM	3	1	0	**4**	0	389	0	**389**	576	6	0	**582**	**975**
8:00AM	0	1	0	**1**	5	443	0	**448**	591	4	0	**595**	**1044**
9:00AM	5	1	0	**6**	2	510	0	**512**	493	0	0	**493**	**1011**
10:00AM	3	1	0	**4**	6	518	0	**524**	522	2	0	**524**	**1052**
11:00AM	3	1	0	**4**	6	529	0	**535**	506	5	0	**511**	**1050**
12:00PM	3	8	0	**11**	5	563	0	**568**	546	10	0	**556**	**1135**
Total	39	35	0	**74**	104	7851	0	**7955**	8231	87	0	**8318**	**16347**
% Approach	52.7%	47.3%	0%	-	1.3%	98.7%	0%	-	99.0%	1.0%	0%	-	-
% Total	0.2%	0.2%	0%	**0.5%**	0.6%	48.0%	0%	**48.7%**	50.4%	0.5%	0%	**50.9%**	-
Lights and Motorcycles	36	31	0	**67**	100	7375	0	**7475**	7782	85	0	**7867**	15409
% Lights and Motorcycles	92.3%	88.6%	0%	**90.5%**	96.2%	93.9%	0%	**94.0%**	94.5%	97.7%	0%	**94.6%**	94.3%
Heavy	3	4	0	**7**	4	476	0	**480**	449	2	0	**451**	938
% Heavy	7.7%	11.4%	0%	**9.5%**	3.8%	6.1%	0%	**6.0%**	5.5%	2.3%	0%	**5.4%**	5.7%

*L: Left, R: Right, T: Thru, U: U-Turn

SR 32/38 & CUMBERLAND RD - TMC
Thu Sep 21, 2017
Full Length (2PM-2PM (+1))
All Classes (Lights and Motorcycles, Heavy)
All Movements
ID: 448855, Location: 40.045641, -85.995666

Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg	South					North					West					East					
Direction	Northbound					Southbound					Eastbound					Westbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2017-09-21 2:00PM	63	179	64	0	**306**	172	199	115	0	**486**	91	526	41	0	**658**	19	422	104	0	**545**	**1995**
3:00PM	62	173	83	0	**318**	152	156	101	0	**409**	68	502	38	0	**608**	15	425	88	0	**528**	**1863**
4:00PM	66	233	130	0	**429**	193	198	99	0	**490**	67	458	26	0	**551**	23	446	134	0	**603**	**2073**
5:00PM	57	271	132	0	**460**	169	187	90	0	**446**	76	458	27	0	**561**	8	477	157	0	**642**	**2109**
6:00PM	55	173	61	0	**289**	122	148	75	0	**345**	87	487	41	0	**615**	7	394	135	0	**536**	**1785**
7:00PM	49	129	37	0	**215**	129	103	92	0	**324**	57	428	35	0	**520**	10	303	88	0	**401**	**1460**
8:00PM	47	117	45	0	**209**	135	109	67	0	**311**	48	363	32	0	**443**	12	260	42	0	**314**	**1277**
9:00PM	37	72	22	0	**131**	62	37	23	0	**122**	35	230	19	0	**284**	5	172	49	0	**226**	**763**
10:00PM	9	50	10	0	**69**	23	20	17	0	**60**	19	115	7	0	**141**	0	87	21	0	**108**	**378**
11:00PM	4	22	7	0	**33**	14	12	4	0	**30**	5	71	1	0	**77**	0	41	16	0	**57**	**197**
2017-09-22 12:00AM	6	22	3	0	**31**	12	2	2	0	**16**	5	40	3	0	**48**	0	26	6	0	**32**	**127**
1:00AM	0	10	0	0	**10**	4	1	4	0	**9**	3	18	0	0	**21**	0	25	3	0	**28**	**68**
2:00AM	1	6	1	0	**8**	4	4	2	0	**10**	1	10	1	0	**12**	0	15	2	0	**17**	**47**
3:00AM	1	6	0	0	**7**	4	2	3	0	**9**	2	16	0	0	**18**	0	24	2	0	**26**	**60**
4:00AM	3	5	1	0	**9**	6	4	6	0	**16**	2	36	1	0	**39**	0	49	6	0	**55**	**119**
5:00AM	12	21	1	0	**34**	32	13	12	0	**57**	13	92	6	0	**111**	5	144	13	0	**162**	**364**
6:00AM	25	57	4	0	**86**	109	38	37	0	**184**	19	229	13	0	**261**	1	371	49	0	**421**	**952**
7:00AM	52	250	19	0	**321**	155	117	123	0	**395**	84	334	19	0	**437**	10	600	146	0	**756**	**1909**
8:00AM	46	129	13	0	**188**	128	121	70	0	**319**	68	371	35	0	**474**	9	510	73	0	**592**	**1573**
9:00AM	40	100	19	0	**159**	131	106	76	0	**313**	59	384	36	0	**479**	8	456	77	0	**541**	**1492**
10:00AM	61	124	33	0	**218**	143	123	90	0	**356**	72	458	51	0	**581**	16	506	84	0	**606**	**1761**
11:00AM	58	134	48	0	**240**	135	115	78	0	**328**	63	531	59	0	**653**	28	436	66	0	**530**	**1751**
12:00PM	77	204	73	0	**354**	134	141	81	0	**356**	83	512	60	0	**655**	21	473	99	0	**593**	**1958**
1:00PM	60	192	78	0	**330**	174	195	94	0	**463**	82	528	65	0	**675**	20	518	99	0	**637**	**2105**
Total	891	2679	884	0	**4454**	2342	2151	1361	0	**5854**	1109	7197	616	0	**8922**	217	7180	1559	0	**8956**	**28186**
% Approach	20.0%	60.1%	19.8%	0%	-	40.0%	36.7%	23.2%	0%	-	12.4%	80.7%	6.9%	0%	-	2.4%	80.2%	17.4%	0%	-	-
% Total	3.2%	9.5%	3.1%	0%	**15.8%**	8.3%	7.6%	4.8%	0%	**20.8%**	3.9%	25.5%	2.2%	0%	**31.7%**	0.8%	25.5%	5.5%	0%	**31.8%**	-
Lights and Motorcycles	874	2600	865	0	**4339**	2281	2134	1350	0	**5765**	1096	6704	607	0	**8407**	214	6760	1525	0	**8499**	27010
% Lights and Motorcycles	98.1%	97.1%	97.9%	0%	**97.4%**	97.4%	99.2%	99.2%	0%	**98.5%**	98.8%	93.1%	98.5%	0%	**94.2%**	98.6%	94.2%	97.8%	0%	**94.9%**	95.8%
Heavy	17	79	19	0	**115**	61	17	11	0	**89**	13	493	9	0	**515**	3	420	34	0	**457**	1176
% Heavy	1.9%	2.9%	2.1%	0%	**2.6%**	2.6%	0.8%	0.8%	0%	**1.5%**	1.2%	6.9%	1.5%	0%	**5.8%**	1.4%	5.8%	2.2%	0%	**5.1%**	4.2%

*L: Left, R: Right, T: Thru, U: U-Turn

SR 32/38 & SR 37 - TMC
Tue Aug 29, 2017
Full Length (3PM-3PM (+1))
All Classes (Lights and Motorcycles, Heavy)
All Movements
ID: 442136, Location: 40.045656, -85.994125

Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg Direction	South Northbound					North Southbound					West Eastbound					East Westbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2017-08-29 3:00PM	210	767	170	2	**1149**	98	583	52	1	**734**	103	380	264	0	**747**	131	275	115	0	**521**	**3151**
4:00PM	201	1012	234	1	**1448**	107	580	58	0	**745**	74	436	254	0	**764**	145	361	180	0	**686**	**3643**
5:00PM	246	1163	187	1	**1597**	89	622	63	0	**774**	96	434	258	0	**788**	132	393	179	1	**705**	**3864**
6:00PM	198	892	143	0	**1233**	90	594	52	2	**738**	109	372	251	0	**732**	103	254	111	0	**468**	**3171**
7:00PM	156	616	106	0	**878**	75	532	27	0	**634**	73	311	249	0	**633**	93	153	76	0	**322**	**2467**
8:00PM	105	508	82	0	**695**	69	407	22	1	**499**	61	183	222	0	**466**	65	157	74	0	**296**	**1956**
9:00PM	83	357	59	0	**499**	27	207	31	0	**265**	41	136	99	0	**276**	46	90	46	0	**182**	**1222**
10:00PM	32	211	51	0	**294**	14	100	17	0	**131**	13	84	56	0	**153**	32	57	28	0	**117**	**695**
11:00PM	19	115	29	0	**163**	9	72	4	0	**85**	9	55	36	0	**100**	14	33	18	0	**65**	**413**
2017-08-30 12:00AM	9	49	13	0	**71**	2	34	3	0	**39**	3	29	16	0	**48**	11	21	8	0	**40**	**198**
1:00AM	7	25	12	0	**44**	4	20	2	0	**26**	3	20	10	0	**33**	11	20	4	0	**35**	**138**
2:00AM	4	20	14	0	**38**	2	28	1	0	**31**	4	12	14	0	**30**	6	3	3	0	**12**	**111**
3:00AM	9	18	5	0	**32**	5	47	5	0	**57**	2	14	12	0	**28**	7	9	3	0	**19**	**136**
4:00AM	7	36	12	0	**55**	13	131	7	0	**151**	3	16	15	0	**34**	13	38	2	0	**53**	**293**
5:00AM	30	81	17	0	**128**	13	416	23	0	**452**	10	43	70	0	**123**	43	110	10	0	**163**	**866**
6:00AM	74	246	36	0	**356**	39	887	65	0	**991**	20	175	154	0	**349**	104	299	55	0	**458**	**2154**
7:00AM	135	454	73	0	**662**	98	1042	93	0	**1233**	31	273	180	0	**484**	177	456	126	0	**759**	**3138**
8:00AM	181	360	82	0	**623**	80	821	85	1	**987**	29	257	199	0	**485**	174	420	64	0	**658**	**2753**
9:00AM	179	375	102	1	**657**	65	604	72	0	**741**	47	258	257	0	**562**	121	302	66	0	**489**	**2449**
10:00AM	183	376	108	0	**667**	55	482	54	0	**591**	65	275	257	0	**597**	151	236	58	0	**445**	**2300**
11:00AM	206	419	130	1	**756**	64	543	69	0	**676**	84	294	304	0	**682**	175	253	62	0	**490**	**2604**
12:00PM	230	533	126	1	**890**	79	532	52	1	**664**	76	332	332	0	**740**	170	297	73	1	**541**	**2835**
1:00PM	248	518	129	1	**896**	63	484	51	0	**598**	67	289	307	0	**663**	163	310	88	0	**561**	**2718**
2:00PM	200	670	146	3	**1019**	71	496	34	0	**601**	72	338	295	0	**705**	164	295	94	0	**553**	**2878**
Total	2952	9821	2066	11	**14850**	1231	10264	942	6	**12443**	1095	5016	4111	0	**10222**	2251	4842	1543	2	**8638**	**46153**
% Approach	19.9%	66.1%	13.9%	0.1%	-	9.9%	82.5%	7.6%	0%	-	10.7%	49.1%	40.2%	0%	-	26.1%	56.1%	17.9%	0%	-	-
% Total	6.4%	21.3%	4.5%	0%	**32.2%**	2.7%	22.2%	2.0%	0%	**27.0%**	2.4%	10.9%	8.9%	0%	**22.1%**	4.9%	10.5%	3.3%	0%	**18.7%**	-
Lights and Motorcycles	2843	9425	1968	10	**14246**	1175	9857	902	6	**11940**	1050	4688	3925	0	**9663**	2154	4548	1477	2	**8181**	44030
% Lights and Motorcycles	96.3%	96.0%	95.3%	90.9%	**95.9%**	95.5%	96.0%	95.8%	100%	**96.0%**	95.9%	93.5%	95.5%	0%	**94.5%**	95.7%	93.9%	95.7%	100%	**94.7%**	95.4%
Heavy	109	396	98	1	**604**	56	407	40	0	**503**	45	328	186	0	**559**	97	294	66	0	**457**	2123
% Heavy	3.7%	4.0%	4.7%	9.1%	**4.1%**	4.5%	4.0%	4.2%	0%	**4.0%**	4.1%	6.5%	4.5%	0%	**5.5%**	4.3%	6.1%	4.3%	0%	**5.3%**	4.6%

*L: Left, R: Right, T: Thru, U: U-Turn