

White Bear Lake Independent School District (ISD) #624 High School Expansion Project



Environmental Assessment Worksheet (EAW)

Project Proposed by:
White Bear Lake School District (ISD #624)



Regulatory Governmental Unit (RGU):
City of White Bear Lake



EAW Prepared by:
Short Elliott Hendrickson, Inc.



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ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at: <http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm>

The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addressed collectively under EAW Item 19.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the EQB Monitor. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. PROJECT TITLE: ISD 624 HIGH SCHOOL EXPANSION PROJECT

2. PROPOSER:

Contact Person: Wayne Kazmierczak
Title: Superintendent, ISD 624
Address: 4855 Bloom Avenue
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3. RGU:

Contact Person: Anne Kane
Title: Community Development Director
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4. REASON FOR EAW PREPARATION:

Required:

- ☐ EIS Scoping
☒ Mandatory EAW

Discretionary:

- ☐ Citizen petition
☐ RGU discretion
☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

Minnesota Rules 4410.4300, Subpart 14(B) – Industrial, Commercial and Institutional Facilities

5. PROJECT LOCATION:

County: Ramsey
City/Township: City of White Bear Lake

Watershed (81 major watershed scale): Rice Creek Watershed District (RCWD) and Vadnais Lake Area Water Management Organization (VLAWMO)

GPS Coordinates: 45.093770, -93.012164

Tax Parcel Numbers: 113022430014, 143022120005, 143022120006, 143022120008, 143022130040, 143022130041, 143022130042, 143022240039, 113022430021, 113022430020, 113022430019, 113022430018, 143022120001, 143022120011, 143022120012, 143022120013, 143022120014, 143022120016, 143022120018, 143022130036, 113022430012, 143022120002, 143022120010, 143022120021, 43022120003, 43022130037, 43022120015

List of EAW Figures (see **Appendix A**):

- Figure 1: Site Location Map
- Figure 2: Proposed Site Plan
- Figure 3: Soils Map
- Figure 4: MN County Biological Survey (MCBS) Map – Sites of Biodiversity Significance
- Figure 5: Bus Circulation and Student Drop-off Routes

6. PROJECT DESCRIPTION:

A. PROVIDE THE BRIEF PROJECT SUMMARY TO BE PUBLISHED IN THE EQB MONITOR, (APPROXIMATELY 50 WORDS).

White Bear Lake Independent School District (ISD) 624 proposes to redevelop an approximately 90-acre site located in the City of White Bear Lake. The site currently serves as the District's North Campus High School (serving Grades 9th & 10th) and Central Middle School (serving Grades 6th through 8th). The proposed school expansion at the North Campus site will create a single campus high school building serving all ISD students in Grades 9th through 12th. The proposed project includes a 397,977 square foot expansion of new institutional building space (classrooms, office, storage, gymnasium, theater, and other accessory/common areas). Other site features will include internal access roads, parking lots, sidewalks, stormwater management features, athletic/activity field improvements, and utility infrastructure for the expanded school and ancillary uses. The property is bound by Bald Eagle Avenue on the west, Division Avenue on the east, the Central Middle School site on the south and the Canadian Pacific Railroad corridor to the north.

B. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

The White Bear Lake Area School District - Independent School District 624 (ISD 624) serves all or parts of Birchwood, Gem Lake, Hugo, Lino Lakes, Little Canada, Maplewood, North Oaks, Vadnais Heights, White Bear Lake, and White Bear Township.

The school district, with a total population of over 60,000 residents, serves nearly 9,000 students in grades PreK-12. The district also offers adult basic education, community education classes, recreation offerings and senior programming.

Beginning in 2017, ISD 624 created a Strategic Plan to study and identify the District's needs and the ability to provide adequate facilities for existing and future student enrollments. Following the Strategic Plan, a comprehensive review of the District's existing facilities and future needs was undertaken. A primary recommendation of the facilities review and planning process was to create a single grades 9-12 high school building. The study gathered internal and external feedback from the community and brought forth a bond referendum that included several capital improvements including the construction of a single White Bear High School building located at the site of the existing North Campus Site (see *Figure 1*). In the fall of 2019, voters in the ISD 624 district approved the referendum, whereby providing the needed funding for the expanded high school. Other operational recommendations being planned include moving the District Offices from Central Middle School to the Sunrise Park building and converting the South Campus High School (currently serving 11th and 12th grades) to a middle school for the southern portion of the District.

As with the current high school buildings, the expanded North Campus High School building will be operational during the traditional school year which is approximately 9.5 months from September to June. The existing North Campus school will remain in operation during construction and the fully expanded school building is anticipated to open to students beginning in the fall of 2024. Construction of the proposed project will occur in phases to maintain school operations. Both during and after construction, the school will continue to operate primarily between the hours of 7:00 am and 4:00 pm with evening events and activities.

Construction of the proposed school expansion will include three additional wings that will be one- and three-story structures (see *Figure 2*). Other associated school facilities include added student and faculty parking (for a total of approximately 1,110 parking spaces at the High School and 184 spaces at Central Middle School), student drop-off zones, school bus loading/unloading zone (23 stalls), and internal access/circulation roads. In conjunction with the school building facilities, ISD 624 proposes to construct or reconfigure the athletic fields and courts at both the North Campus site and Central Middle School site. The proposed facilities will accommodate a variety of activities including, but not limited to, physical education classes and team sports such as football, soccer, lacrosse, tennis, track & field, etc. The centrally located track and field is proposed to include "stadium lighting" for evening events. At this time the seating capacity (bleachers) is being planned for approximately 1,000 spectators and larger events (e.g. varsity football) will continue to utilize the ISD 624 stadium facility located at South Campus.

Included in the project site is the Central Middle School. While no exterior building improvements will occur, the Middle School facilities will be expanded into what is currently District administrative space. The school administration facilities will be relocated to what is currently Sunrise Park Middle School, which is located several miles south of the proposed high school expansion site. Additionally, the two schools propose to share a new bus loading and drop off zone and the athletic/activity facilities.

Roadway improvements in the study area will also occur in conjunction with the school improvements. These improvements are being developed by ISD 624, in close coordination with the appropriate roadway authorities (MnDOT, Ramsey County, and White Bear Lake). Transportation improvements include traffic control changes, intersection safety/capacity improvements, and enhanced pedestrian/bicycle facilities. Utility infrastructure will be improved within and to the project site. Added water utility connections to the City's mainline along Division Avenue will be installed to improve looping and provide redundancy in the system. Sanitary sewer plans to reconnect to the existing gravity lines and lift station along Bald Eagle Avenue. Ongoing discussions with the City have identified another option that is being explored which

would provide a direct sanitary sewer connection to the Metropolitan Council trunk line that runs adjacent to the railroad tracks located at the north end of the school site. Stormwater infrastructure will include both surface and underground collection and treatment system that will be design in accordance with local and state regulations.

C. Project Magnitude:

Total Project Acreage	90 acres ¹
Linear Project Length	N/A
Number and Type of Residential Units	N/A
Commercial Building Area (square feet)	N/A
Industrial Building Area (square feet)	N/A
Institutional Building Area (square feet)	669,000 gross sq./ft. <i>(271,023 existing; 397,977 proposed)</i>
Other Uses (describe)	N/A
Structure Height(s)	55' (highest building)

¹ The project acreage represents the area associated with the District's "Master Site Plan."

D. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

The project is being proposed by ISD 624 (White Bear Lake School District). Construction of the proposed project will also be carried out by ISD 624 for the purpose of creating a single grade 9-12 high school building that will provide adequate class room sizes, state-of-the-art technology, and supporting ancillary facilities (e.g. athletic/activity fields and courts, parking lots, etc.) for the District's projected student enrollments. Construction of the single high school building would benefit the surrounding communities and students by improving the educational facilities now and into the future.

E. Are future stages of this development including development on any other property planned or likely to happen? ☐ Yes ☒ No

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

The current full build out plan has been included in this EAW. ISD 624 has no future stages planned. However, space surrounding the school may become available for future improvements (e.g. expanded parking and/or activity fields). Any future development or redevelopment needs of the site will be based on the demand/growth within the School District, as well as available property surrounding the school site. Any future improvements will follow all applicable permitting and environmental review processes.

F. Is this project a subsequent stage of an earlier project? ☐ Yes ☒ No

If yes, briefly describe the past development, timeline and any past environmental review.

There have been no subsequent stages of this proposed project nor have any past environmental reviews on the proposed site been completed by ISD 624.

7. COVER TYPES: Estimate the acreage of the site with each of the following cover types before and after development:

Cover Type ¹	Before	After
Wetlands	7.7 acres	6.7 acres
Deep Water/Streams	0 acres	0 acres
Wooded/Forest	17.4 acres	9.7 acres
Brush/Grassland	0 acres	0 acres
Cropland	0 acres	0 acres
Lawn/Landscaping/Activity Fields	35.7 acres	28.8 acres
Impervious Surface (buildings, parking lots, sidewalks)	29.0 acres	43.3 acres
Stormwater Pond	0.2 acres	1.5 acres
Other (describe)	0 acres	0 acres
Total	90.0 acres	90.0 acres

¹ Cover type estimates based on University of Minnesota Geospatial Commons TCMA 1-M Land Cover Classification data, 2020 wetland delineations, aerial interpretation, and existing/proposed site plans.

8. Permits and Approvals Required:

List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, tax increment financing and infrastructure. All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.

Unit of Government	Type of Permit/Approvals	Status
City of White Bear Lake	Site Plan Review	To Be Obtained
City of White Bear Lake	Comprehensive Plan Amendment to re-guide parcels from Low Density Residential to Public/Semi-Public	To Be Obtained
City of White Bear Lake	City Land Use Development/Building Permits	To Be Obtained
City of White Bear Lake	Roadway/Access Permit (Division Ave.)	To Be Obtained
Ramsey County	Roadway/Access Permit (Bald Eagle Ave.)	To Be Obtained
Rice Creek Watershed District	Water Quality Plan Approval	To Be Obtained
Rice Creek Watershed District	Wetland Conservation Act	To Be Obtained
Vadnais Lake Area Water Management Org.	Water Quality Plan Review	To Be Obtained
Minnesota Pollution Control Agency (MPCA)	NPDES/SDS Construction Stormwater Permit	To Be Obtained
	Sanitary Sewer Extension	To Be Obtained
Minnesota Department of Labor & Industry	Plumbing Plan Review	To Be Obtained
Minnesota Department of Health	Food Service	To Be Obtained
Minnesota Department of Transportation	Traffic Signal Installation/Modification	To Be Obtained

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

9. Land Use:

A. Describe:

- i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.

The project is proposed on the same location as the existing White Bear Lake High School North Campus and involves several existing residential parcels. The site contains educational buildings, parking areas, bus parking/maintenance garage, athletic facilities, and other associated uses. Other land uses in the surrounding area include single family residential developments, Soo Line Railroad corridor, and the Central Middle School site.

- ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The City of White Bear Lake's 2040 Comprehensive Future Land Use Plan identifies "Public/Semi-Public" land use for the ISD 624 owned property and low density residential for the private single-family homes surrounding the school site.

- iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The City's Zoning Map shows the study area is classified under three zoning districts including: P: Public; R-3: Single Family Residential, and R-4: Single Family/Two Family Residential. There are no special districts/overlays associated with the site. Any private properties acquired as part of the proposed expanded school will be rezoned to P: Public/Semi-Public, in accordance with City policies and procedures.

B. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

The ISD 624 single high school campus will be compatible with nearby land uses. This site has operated as a public high school for several decades. Rezoning of several adjacent residential properties from R-3 and R-4 zoning districts to P (*Public Use*) is allowable under the City of White Bear Lake zoning requirements. The expansion of the school site will increase traffic levels, water usage, and impervious surfaces as compared to the existing conditions.

C. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

As part of the planning and site development process, several mitigation elements to avoid and/or minimize potential effects of the proposed development have been identified and coordinated with the City of White Bear and ISD 624.

Increased traffic levels for the area will be mitigated by making improvements to the local transportation system including safety and capacity improvements, traffic control modifications, access/roadway modifications, and enhancements for pedestrian/bicycle movements. Further explanation of the mitigation elements is included under EAW Item 18: Transportation.

Newly constructed buildings, parking lots, roads, and sidewalks will increase impervious surfaces on the site and result in increased runoff quantities and velocity. In response to this condition, the site will incorporate stormwater best management practices (BMPs) to convey, retain, infiltrate, and treat runoff before it leaves the site. Further information on the proposed BMPs is include under EAW Item 11.

On-site sanitary sewer and water utilities that service the school site will be modified as needed to ensure adequate capacity is provided to handle service demands from the expanded school site. Further information on the proposed BMPs is include under EAW Item 11.B.

10. GEOLOGY, SOILS AND TOPOGRAPHY/LAND FORMS:

- A. Geology - describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

Susceptible geology features (listed under Item 10A. above) are not present in the project area.

- B. Soils and topography - describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.B.ii.

NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 11 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 10.

The Soil Survey indicated the site soil units consist of: Isanti loamy fine sand, depressional (Map Unit #161); Lino loamy fine sand (#162); Urban land-Zimmerman complex, 1 to 8 percent slopes (#859B); Urban land-Lino complex, 0 to 3 percent slopes (#863); Urban land (#1039); Aquolls and histosols, ponded (#1055). **Figure 3** depicts the site soil types for the project area. Of the identified soil types, Isanti and Aquolls and histosols are considered hydric soils. No highly erodible or steep slopes are present on the site.

Approximately half of the 90-acre project area will be disturbed because of construction activities. The NPDES/SWPPP permit requirements will include both temporary (during construction) and permanent soil stabilization and erosion control measures. The phased construction will limit the disturbed areas to the active phase/staging areas, leaving space for school operations. Portions of the site will be completed and restored

before the subsequent phase(s) begin. Following construction, all exposed soils will be vegetated to help reduce erosion and protect surface waters and groundwater.

Site elevations range from approximately 940 feet above mean sea level (msl) in the central portion of the School Site to approximately 926 msl in the northwest. The study area generally slopes from the central and southern portion of the site towards the wetlands in the northwestern and central portions of the study area. Erosion/sedimentation control related to stormwater runoff is addressed below in Item 11/B.ii.

11. WATER RESOURCES:

A. Describe surface water and groundwater features on or near the site in A.i. and A.ii. below.

- i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

Four surface water features (62-0002P, 82-167P, 62-23W, and 62-98W) listed on the MNDNR Public Waters Inventory (PWI) are located outside the project site boundary but within 1 mile of the study area. A fifth PWI feature is in the northwestern corner of the school site (62-99W). These features include the following:

- Bald Eagle Lake (PWI #62-0002P) is located approximately ¼ mile north of the study area. This surface water body is listed as an impaired lake for aquatic consumption (AQC) and aquatic recreation (AQR) due to excess nutrient concentrations and high mercury levels in fish tissue (Hg-F). A detailed Total Maximum Daily Load study was completed in 2012.
- White Bear Lake (PWI #82-167P) is located approximately ½ mile southeast of the study area. This surface water body is listed as an impaired lake for AQC and Hg-F levels.
- Unnamed Wetland (62-23W) is located approximately 0.6-mile northwest of the study area. This surface water is listed as an impaired water for AQR due to nutrient concentrations.
- Unnamed Wetland (62-98W) is located approximately 0.3 miles east of the study area
- Unnamed Wetland (62-99W) is in the northwest corner of the school property/study area

Wetland delineations for the site were completed on April 30, 2020 and a follow up field reconnaissance was completed on October 5, 2020. The site investigations identified 5 wetland basins throughout the study area. See **Appendix B** for additional information and mapping of the delineation wetlands.

- ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

According to the Ramsey County Geologic Atlas – Surficial Hydrogeology data, groundwater near elevation in proximity to the school site are near 925 msl. Therefore, the depth to groundwater ranges from approximately 1- to 15-feet below the ground surface.

According to White Bear Lake's Wellhead Protection Plan, the school site is not located within a designated wellhead protection or drinking water supply management area.

According to the Minnesota Department of Health (MDH) Well Index, one well is located near Central Middle School. The MDH data indicates this is an active irrigation well with a drilled depth of 183 feet. The MDH Well index identifies several domestic wells associated with residential building sites located in proximity to the school site, but none of these sites will be impacted by the proposed project.

B. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item B.i. through Item B.iv. below.

i. Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

Development of the expanded school will continue to produce and increase the amount of wastewater from the site. The wastewater generated in the school will be sanitary sewage and no pre-treatment will be required since the waste will be serviced by the City and Metropolitan Council Environmental Services sanitary sewer lines and ultimately treated at the Metropolitan Wastewater Treatment Plant.

Based on water load estimates for the proposed school site, a total of 61,000 gallons per day is estimated to be produced. The existing lines and treatment plant have the capacity to handle this quantity of wastewater. Ongoing coordination with the City of White Bear Lake and White Bear Township is planned to determine the appropriate connection(s) between the school site and existing sanitary sewer lines.

2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.

Not applicable to the proposed ISD 624 school expansion project.

3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

Not applicable to the proposed ISD 624 school expansion project.

ii. Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

Existing stormwater from the study area runs off the site in several directions. Most of the existing North Campus School building, including the surrounding parking areas, slope to the north towards existing wetlands surrounding the athletic fields. The study area lies within the Rice Creek Watershed District (northern portion of study area) and the Vadnais Lake Area Water Management Organization (southern portion of study area). Coordination with these water resource agencies has been initiated and will continue through all phases of project development (planning, design, permitting, and construction).

The post school expansion drainage patterns on the site will maintain the existing drainage patterns. The City of White Bear Lake's development standards and requirements of the National Pollutant Discharge Elimination System (NPDES) permit and Stormwater Pollution Prevention Plan (SWPPP) guidelines are being used in the development of the site design and proposed drainage improvements will comply with the permit requirements and guidelines.

Best management practices such as sedimentation basins, silt fence, erosion logs, inlet protection, erosion control blankets, riprap, etc. will be used to control erosion during grading, building, and parking lot construction, and utility installation. Final site stabilization and turf restoration will be established prior to removal of temporary construction BMP's.

Post-construction of the project will result in an increase of impervious surfaces on the project site of approximately 14.3 acres. The majority of the added impervious is a result of the school building expansion, new parking lots, access roads, and sidewalks.

In accordance with City and watershed requirements, stormwater best management practices (BMPs) are being designed to infiltrate 1.1" from new impervious and no increase in runoff rates for 2-, 10-, and 100-year storm events. To meet this requirement, a series of stormwater ponds/infiltration basins and underground chamber cells will be constructed throughout the site (see **Figure 2**). The stormwater BMPs will convey, capture, and treat stormwater from the school buildings, parking lots, sidewalks, and entrance roads. The project will also utilize vegetated overland flow that currently exists to slow the rate of stormwater traveling across the site to nearby water resources. These naturally existing vegetated areas allow for rate reduction and infiltration of stormwater prior to entry into surface waters.

iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

The school site is currently connected to the City of White Bear Lake's municipal water supply provided to the site via connections to the Division Avenue watermain line. Existing water main lines will be utilized and upgraded as needed, including added connections to improve looping and provide redundancy in the system. The water demand for the expanded school site has been estimated to be 20 gallons/person/day for an estimated total of 61,000 gallons per day.

If temporary dewatering is necessary for construction activities a MNDNR water appropriations permit will be obtained.

iv. Surface Waters

- a) **Wetlands** - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

Based on wetland boundaries delineated in 2020, it is anticipated that up to 1.0 acre of impacts could occur because of the proposed project. The impacts to natural wetland areas are primarily a result of improving the Louricas Athletic Fields located at the north end on the study area (see **Figure 2**). These recreational fields are used for a variety of school and athletic association activities, but in the past have frequently experienced wet grass conditions due to site runoff and highwater table levels in this area.

Two previously constructed stormwater basins have taken on the characteristics of wetlands. These basins will be impacted with the project but since they were created for stormwater management, they are exempt from the Wetland Conservation Act for the required replacement.

All jurisdictional wetland areas in the project area are protected by state and federal law and impacts are only allowed through a permitting process involving the City of White Bear Lake, Rice Creek Watershed District, the Minnesota Department of Natural Resources. Wetland impacts will be mitigated according to replacement ratios and through purchasing wetland credits from an approved wetland bank site. The project is located within Bank Service Area (BSA) #7 – Middle Mississippi.

- b) **Other surface waters**- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

No other surface waters are present on the site or will be directly altered by the proposed project.

12. CONTAMINATION/HAZARDOUS MATERIALS/WASTES:

- A. **Pre-project site conditions** - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a contingency plan or response action plan.

The presence of potentially contaminated properties (defined as properties where soil and/or groundwater is impacted with pollutants, contaminants, or hazardous wastes) is a concern due to the potential liabilities associated with ownership of such properties, potential cleanup costs, and safety concerns associated with construction personnel encountering unsuspected wastes or contaminated soil or groundwater. Contaminated materials encountered must be properly handled and treated in accordance with state and federal regulations. Improper handling of contaminated materials can worsen their impact on the environment.

A search of MPCA's "What's in My Neighborhood" website revealed that the White Bear Lake School site, including the educational building site and transportation maintenance/storage facility (Bus Garage), is identified by MPCA as a hazardous waste site and is the location of:

- Aboveground Storage Tank Site – TS 0052778 (265 gallon)
- Underground Storage Tank Site – TS 0014560 (3 active tanks: 4,000 gallons; 560 gallons; 10,000 gallons)
- Underground Storage Tank Site – TS 0003484 (15,000 gallon)
- Leak site – LS 0004140 – closed and closure request reviewed in April 1996
- Very Small-Quantity Hazardous Waste Generation – MND982210486 and MND100332410

Leak site (LS 0004140) was discovered and reported in 1991. Gasoline from an underground fuel tank had leaked into the surrounding soil. Remedial investigations and correction actions were performed, and the site closure review was finalized in 1996. Additional underground tanks have been permitted and installed on the site. The tanks located at the Bus garage are currently active but will be removed from the site as part of school expansion.

The project site was also identified as a very small-quantity hazardous waste generator (MND982210486 and MND100332410). Hazardous waste includes substances that are corrosive, explosive, toxic and/or fire hazards. In 2017 and 2018, it was reported that the site generated 24 gallons and 46 gallons of hazardous waste (e.g. waste paint and degreasing solvent), respectively. Further details about hazardous waste in recent years were not available from the MPCA website.

The school currently uses a natural gas heating system that includes a steam boiler to water heat exchanger unit and a backup fuel oil system. A new natural gas heating system will replace the existing units. The new system will consist of condensing boilers that provide 30% propylene glycol/70% water solution to all school buildings.

Unknown materials may be encountered during construction that were not identified during site investigations. A Construction Contingency Plan (CPP) will be prepared to identify how to handle any contaminants encountered.

B. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

Construction of the proposed school site improvements will generate construction-related waste materials, which will either be recycled or disposed of in the proper facilities in accordance with state regulations and guidelines. Construction activities are not expected to store, generate, or release hazardous materials in quantities or concentrations that pose a substantial risk of environmental effects.

After completion of construction, the high school will generate and store small amounts of hazardous wastes consistent with other institutions, such as paints, copier toner, cleaners, adhesives, and other laboratory

chemicals. The potential for adverse effects will generally be minimized by storing small quantities of hazardous substances in secure storage facilities that are not accessible by students.

ISD 624 has implemented a robust recycling program to ensure waste goals from their facilities are minimized to the extent practicable. All municipal solid waste will be hauled away by local, licensed garbage haulers.

C. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

Temporary storage tanks for petroleum products may be located on the site for refueling construction equipment. Appropriate measures will be taken during construction to avoid spills that could contaminate groundwater or surface water in the study area. In the event of a leak or spill during construction, immediate and appropriate action to remedy the situation would be taken immediately in accordance with city, county, state, and federal guidelines, and regulations.

Construction related wastes may include hazardous products such as asphalts and heavy oils, and waste from construction vehicles which could include oil, antifreeze, and lubricants. Any on-site wastes produced will be disposed of in accordance with applicable regulations.

The proposed project will include a limited amount of long-term generation/storage of hazardous materials from the high school complex. Anticipated items include paint, stain, automotive chemicals, science laboratory chemicals, and household/industrial cleaning chemicals. Small containers of hazardous wastes will be stored in OSHA-approved containers/cabinets and disposal will occur off-site and in accordance with applicable regulations.

D. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

Regulated material and/or hazardous waste generated during demolition activities, construction, or school operations may include demolition debris from asbestos-containing building materials, used copier toner cartridges, used containers from solvents or adhesives, commercial cleaning supplies, and classroom laboratory chemicals. Any toxic or hazardous materials will be stored and disposed of in compliance with state regulations.

13. FISH, WILDLIFE, PLANT COMMUNITIES, AND SENSITIVE ECOLOGICAL RESOURCES:

A. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

The study area consists of a school site and residential properties with institutional buildings, single family residences, grassy open space (athletic fields and lawns), small wooded areas, and wetlands. The limited habitat found within the study area is commonly used by a variety of wildlife species including, but not limited to, whitetail deer, fox, turkeys, turtles, raccoon, skunk, porcupine, mice, voles, squirrels, snakes, turtles, toads and frogs, songbirds, migratory waterfowl, and migratory birds.

- B. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota county biological survey sites of biodiversity significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-1027) and/or correspondence number (ERDB_____) from which the data were obtained and attach the natural heritage letter from the DNR. Indicate if additional habitat or species survey work has been conducted within the site and describe the results.

Under a licensed copy (LA-1027) of the MNDNR Natural Heritage Inventory System (NHIS), a review of the state's data was accessed in order to determine if known locations of rare plant or animal species or other significant natural/ecological resources are known to occur in or near the project area. The search identified occurrences for three vascular plant species and one vertebrate animal species within a one-mile radius of the school site. According to the data, the following NHIS-listed species have been observed within the search area: Jointed Rush (*Juncus articulatus*), Few-flowered Spikerush (*Eleocharis quinqueflora*), Narrow-leaved Water Plantain (*Alisma gramineum*), and the Blanding's Turtle (*Emydoidea blandingii*). None of these occurrences have been on or immediately adjacent to the school site, therefore the proposed school expansion is not anticipated to impact these species.

According to the Minnesota County Biological Survey (MCBS) there are no sites of biodiversity significance located in the study area. One "below average" site is located just north of the study area (see **Figure 4**). The MCBS review also identified "moderate" sites, located within one mile of the study area. No adverse impacts to these sites are anticipated.

Other federally listed species include the northern long-eared bat (NLEB) and the Rusty Patched Bumble Bee (RPBB). The NLEB is a species of special concern in Minnesota and is listed as threatened by the US Fish and Wildlife Service (USFWS). No known hibernacula or roost trees are identified in proximity to the study area; therefore, the proposed project is not anticipated to impact this species. Based on the Minnesota-Wisconsin USFWS Field Office's Habitat Connectivity Model, the study area falls within a "low potential zone" for the RPBB. No adverse impacts to this species are anticipated.

- C. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

Construction and operation of the expanded school site will not result in direct impacts to the common urban wildlife species that frequent the study area. The wildlife species likely to utilize the urban landscape are mobile and are expected to move to other nearby locations also suitable as habitat and foraging areas. The school expansion and associated improvements will convert approximately 14.3 acres of vegetative landscape to impervious surfaces such as the expanded school building footprint and increased parking lots and sidewalks. These activities include the removal of trees and other vegetation. To avoid indirect impacts to fish, wildlife, and water quality, appropriate erosion and sediment control best management practices will be implemented during the construction phase.

Invasive species are plants and animals that are not native to an area and can cause harm to native species and/or plant communities. On a development project such as that proposed by ISD 624, preventative measures can be taken to minimize the likelihood of introducing invasive species, such as securing local materials to avoid

the long-range movement of goods or washing vehicles prior to accessing the construction site. Additionally, landscape design utilizing native plants is proposed.

D. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

Areas proposed to be impacted by the construction of the expanded school and associated improvements (parking lots and athletic fields) are previously disturbed areas (existing North Campus, athletic fields, and surrounding urban developments). There are no anticipated adverse effects to fish, wildlife, plant communities, or sensitive ecological resources.

A complete landscape/vegetation plan is being developed and will be in accordance with City zoning and replacement requirements. Vegetative screening of adjacent residential properties will also be provided per city code.

14. HISTORIC PROPERTIES:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the state historic preservation office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

A literature search was conducted for the study area to determine if any known archaeological or historic cultural resources have been previously identified surrounding the school site. Information obtained from the Minnesota State Historic Preservation Office (MnSHPO) shows there are no known archaeological sites within proximity to the project site boundary. A copy of the correspondence letter received from the MnSHPO is included in **Appendix C**. MHS data included a number of known historic/architectural sites within the study area; however, no previously identified historic/architectural resources were identified within the project site boundary. Therefore, no archaeological or historical site impacts or disturbances are anticipated. Should suspected historical or archaeological resources be encountered during construction, work will cease, and the Minnesota SHPO will be contacted for further guidance.

15. VISUAL:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

There are no scenic views or vistas located on or near the property, and substantial adverse effects on visual resources are not anticipated in conjunction with the project. The project will involve the expansion of the school site footprint, increase in building heights, and expansion of lot coverage, however, the proposed site plan is consistent with the land uses located at North Campus and Central Middle School. Therefore, no substantial visual effects are expected on views from the surrounding neighborhood properties. The proposed improvements to the athletic facilities will include field lighting for the centrally located football/soccer field and track facility. This site is planned as a long-term "stadium field" for various activities, including varsity competitions, except for varsity football games which are currently planned to remain at South Campus. Installation of lighting will consider

surrounding land uses and potential for light glare. Additional details of the field lighting will be provided as part of the City of White Bear Lake Land Use Application. The school site will not include vapor plumes/emissions.

16. AIR:

A. Stationary source emissions - describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used to assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

The proposed project will not include heavy industrial facilities or substantial stationary greenhouse gas (GHG) emissions. The existing natural gas boiler and fuel oil back-up system will be removed and replaced with a new high efficiency natural gas boiler system, which is expected to reduce emissions from the school heating and cooling systems.

The Minnesota EQB is working on a framework for integrating GHG quantification and assessment requirements into the Environmental Review Program, but methods and requirements are not yet complete.

GHG emissions from this project, while unquantified, are not expected to cause potential for significant environmental effects. No readily available GHG emission estimates exist that show a comparably sized Minnesota project with potential to exceed the mandatory EAW threshold of 100,000 tons of CO₂e per year (Minnesota Rules Part 4410.4300, Subp. 15.B.). Although the project is not expected to have significant GHG impacts, several opportunities for climate change and GHG mitigation and adaptation exist. Potential GHG and climate change mitigation measures that may be considered include:

- Use energy efficient building materials that reduce needs for heating and cooling
- Install programmable thermostats throughout the school complex
- Install roofing materials that reflect solar energy and save energy
- Revegetate open space areas with prairie/no-mow grasses to decrease mowing and increase carbon sequestration
- Install smart irrigation to reduce outdoor water use
- Install electric vehicle charging stations to make the site more energy autonomous and EV-ready
- Participate in a compost program for organic solid waste to reduce the burden on and future methane emissions from local solid waste landfills.

B. Vehicle emissions - describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. Traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

Typical of most developments, the school expansion project will generate air pollution because of increased motor vehicle activity. Motor vehicles emit a variety of air pollutants including carbon monoxide (CO), hydrocarbons, nitrogen oxides, and particulates. The primary pollutant of concern is CO, which is a byproduct of the combustion process of gasoline engines. CO concentrations are highest where vehicles idle for extended periods of time. For this reason, CO concentrations are generally highest in vicinity of signalized intersections

where vehicles are delayed and emitting CO. Generally, concentrations approaching state air quality standards are found within about 100 feet of a roadway source. Further from the road, the CO in the air is dispersed by the wind and diluted in the air such that concentrations rapidly decrease.

The Minnesota Department of Transportation (MnDOT) has developed a screening method designed to identify intersections that will not cause a carbon monoxide (CO) impact above state standards. MnDOT has demonstrated that even the 10 highest traffic volume intersections in the Twin Cities do not experience CO impacts. Therefore, locations with traffic volumes lower than these 10 highest intersections are not anticipated to cause a CO impact above state standards. MnDOT's screening method demonstrates that intersections with total daily traffic volumes below 82,300 vehicles per day will not have the potential for causing CO air pollution problems. Traffic levels within and surrounding the school site will be highest at the morning drop-off and afternoon pickup times, when parent vehicles, school buses, and staff vehicles will be in operation. Vehicle idling will be minimized to student pick-up times at the end of the school day. None of school site operations or surrounding intersections in the study area exceed the MnDOT criteria that would lead to air quality concerns.

C. Dust and odors - describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation (fugitive dust may be discussed under Item 16a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

The primary sources of dust generated by the project will occur during the construction phase. Sources include ground disturbance and site preparation, grubbing and demolition of existing structures and associated movement of demolition debris, the construction of parking areas/internal roads, and the transport of construction materials and vehicles across the project site. If necessary, temporary dust control measures may be utilized (such as water spraying exposed soils) during construction to minimize impacts to adjacent properties. Long-term operation of the school will not result in substantial sources of dust generation.

Odors routinely generated during construction will be typical of those associated with construction, such as exhaust from petroleum- powered construction equipment. The occupancy of the proposed school expansion project is not expected to generate objectionable odors.

17. NOISE

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Noise levels will temporarily increase locally during project construction due to mobilization of heavy equipment, demolition activities, and construction of the proposed structures. Noise levels when the expanded school is fully operational are not anticipated to be substantial but are expected to rise slightly from existing levels due to increases in transportation noise, student activities, and heating/cooling systems at the school. Operations noise levels will increase from existing levels, though the facility will produce noise in-kind with current land use. Noise levels will fluctuate throughout the day, with greater noise levels during the student drop-off and pick-up hours.

Noise levels on and adjacent to the project area will vary considerably during construction, depending on the amount of construction that occurs simultaneously, the time of operation, and the distance from construction

equipment to noise receptors. The noise receptors nearest to the project are the homes located along Division Avenue and Bald Eagle Avenue. Noise generated by construction equipment and building construction and renovation will be limited primarily to daylight hours when noise is relatively common. The City of White Bear Lake regulates noise, including noise resulting from construction activities.

18. TRANSPORTATION

- A. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other travel modes.

Parking

According to the City of White Bear Lake's Ordinance, the high school site must provide a minimum of 1 parking stall per 3 students and 1 parking stall per 3 classrooms. A breakdown of the High School site parking requirements and proposed conditions are as follows:

- 1 per 3 students: $3200 \text{ students} / 3 = 1067 \text{ stalls}$
- 1 per 3 classrooms: $123 \text{ teaching stations} / 3 = 41 \text{ stalls}$
- Total Required = 1,108 stalls

The site design for the proposed High School Expansion Project provides 1,113 car parking stalls and 23 bus parking stalls (bus stalls are shared with the Middle School). The current breakdown of car stalls includes visitors (25 stalls), staff (280 stalls), and students (808 stalls). The distribution of student parking permits will follow ISD 624 parking permit policies and procedures.

The Central Middle School Site (located immediately south of the High School) will also comply with City Ordinance requirements (at least 1 parking space for each classroom, plus 1 additional space for each 50 students). A breakdown of the Middle School site parking requirements and proposed conditions are as follows:

- 1 per 57 classrooms = 57 stalls
- 1 per 50 students = $1356 / 50 = 28 \text{ stalls}$
- Total Required = 85 stalls

The total number of parking stalls provided at Central Middle School includes 214 car stalls and 23 bus stalls (bus stalls are shared with the High School).

Bus Circulation and Student Drop-Off

As depicted in **Figure 5**, located in **Appendix A**, all school buses are planned to access/exit the school campus site from Bald Eagle Avenue. Due to staggered school start times and release times, the High School and Central Middle School buses will both utilize the proposed drop-off/pick-up area.

Vehicle drop-off/pick-up for students at the High School Expansion site will occur at two primary locations. One location will be located off Bald Eagle Avenue and circulate from the southern entrance to the northern access on Bald Eagle Avenue (see Figure 5 in Appendix A). Another student drop-off/pick-up option will be located along Division Avenue and will circulate through the northern access point (See **Figure 5**).

Traffic Impact Study

A detailed traffic impact study was completed for the school expansion project (see **Appendix D**). Traffic operations and safety conditions for the year of opening (2024) and full build out condition (2028) were analyzed.

The existing number of parking spaces at the high school building is 311 spaces. The future site plan includes 1,110 spaces at the High School and 184 spaces at Central Middle School, which complies with the City of White Bear Lake parking requirements. A 23-stall bus lot is proposed and centrally located on the site. The bus lot will be shared between the expanded high school site and Central Middle School. All buses are planned to be routed through the site via the access road to Bald Eagle Avenue. Designated student drop-off/pick-up lanes are planned along both the east and west sides of the site with access to Division Avenue and Bald Eagle Avenue, respectively.

Due to the national pandemic in 2020 and the resulting school operation changes, existing school year traffic volumes could not be accurately counted. As a result, traffic demands at 25 key intersections in the study area were reviewed using StreetLight data. StreetLight is a “big data” online platform that collects historic traffic and trip data from GPS applications and devices. For this study, the StreetLight data was used with existing average annual daily traffic (AADT) information from MnDOT to estimate hourly traffic demands throughout the day. Future enrollment and trip distribution estimates for Central Middle School and the expanded High School were used to forecast AM and PM school traffic peak hour volumes generated by the school sites. Both the AM (arrival) and PM (dismissal) traffic volumes for year 2024 and 2028 are presented below:

2024 School Trip Generation¹							
Site	Enrollment ²	School Arrival Peak (AM)			School Dismissal Peak (PM)		
		Enter	Exit	Total	Enter	Exit	Total
WBL High School	2,850	1,037	445	1,482	282	658	940
Central Middle School	1,350	423	360	783	217	255	472
Total		1,460	805	2,265	499	913	1,412
2028 School Trip Generation¹							
Site	Enrollment ²	School Arrival Peak (AM)			School Dismissal Peak (PM)		
		Enter	Exit	Total	Enter	Exit	Total
WBL High School	3,476	1,265	542	1,807	344	803	1,147
Central Middle School	1,350	423	360	783	217	255	472
Total		1,688	902	2,590	561	1,058	1,619

¹ Trip generation estimates based on the Institute of Transportation Engineer's (ITE) Trip Generation Manual, 10th Edition.

² Enrollment data based on the White Bear Lake School District's Demographic, Housing, & Enrollment Analysis Report, 2018.

Alternative transportation modes have been considered in developing the trip generation estimates including the following modes: school busing, walking, and biking. A future bus rapid transit station is planned at the Highway 61/8th Street intersection, but operations of this transit operation is assumed after the 2024 year of opening for the expanded school.

- B. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 (available at: <http://www.dot.state.mn.us/accessmanagement/resources.html> or a similar local guidance).

As part of the detailed Traffic Study, traffic operations analyses using Synchro/SimTraffic (Version 9) modeling software was used to determine the level of service (LOS), delay, and queuing of traffic for the school arrival and dismissal peak hour conditions. LOS is a qualitative rating system used to describe the efficiency of traffic operations at an intersection. Six LOS are defined, designated by letters A through F. LOS A represents the best operating conditions (no congestion), and LOS F represents the worst operating conditions (severe congestion). The study considered several school start/dismissal time scenarios for both the expanded High School and Central Middle School (located just south of the high school complex). The study recommends a later high school start time in the morning, which creates a beneficial effect on morning traffic operations surrounding the school sites as well as along Highway 61 (see **Appendix D** for a copy of the Traffic Impact Study Report).

- C. Identify measures that will be taken to minimize or mitigate project related transportation effects.

Based on the traffic operations analysis and coordination with the City of White Bear Lake, Ramsey County, and MnDOT, the following mitigations were found to greatly improve traffic operations for the study intersections.

- Highway 61
 - Optimize the signal timing along Highway 61 to provide sufficient green time for the northbound left turn and eastbound phases to improve school traffic operations while maintaining the acceptable splits for through vehicles on Highway 61 based on MnDOT signal timing guidance.
 - Add traffic signal at the Highway 61 and 8th Street intersection, including turn lane modifications for the northbound and eastbound approaches. Also, requires removal of the southbound left turn lane at 7th St.
 - Reconfigure the Hwy 61 center median between 7th Street and 8th Street to extend the length of the northbound left turn lane at 8th Street.
 - Add an eastbound right turn lane on 8th Street at Hwy 61.
 - Add an eastbound protected phase at the Highway 61/Buffalo Street signalized intersection during the school dismissal peak hour to help alleviate long back-ups on northbound Hugo Road.
- 8th Street
 - Consider traffic control changes at the Division Avenue/8th Street intersection. An alternatives evaluation process will consider a range of options.
 - Between Hwy 61 and Bloom Avenue, widen 8th Street to accommodate two lanes of traffic, an on-street parking lane and a 6-foot wide sidewalk.
- Division Avenue
 - Add a northbound left turn lane into the student parking access driveway on Division Avenue.
 - Provide dedicated right and left turn lanes into the school site at the pick-up/drop off access driveway.
- Bald Eagle Avenue
 - Add dedicated right and left turn lanes to Bald Eagle Avenue at the primary access driveway to the site.

Further consideration and design of the recommended transportation improvements, along with pedestrian and bicycle enhancements, will be coordinated with the appropriate roadway jurisdiction.

19. CUMULATIVE POTENTIAL EFFECTS: (Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW items)

- A. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.**

The geographic scale is limited to within 1 mile of the project and analysis is limited to those social, economic, and environmental conditions that may be directly affected by the proposed project (e.g. land use, wetlands, wildlife, and transportation/traffic). Timeframes of the analysis will be based on known projects in the last 5 years and known comprehensive planning activities within the City of White Bear Lake and White Bear Township.

- B. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.**

Cumulative effects result from the incremental impact of the proposed project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. The geographic area considered for cumulative potential effects is the area proximate to the project limits, specifically within the planned ISD 624 school expansion area and properties located within proximity (1-mile radius from the study area). Both the City of White Bear Lake and White Bear Township were contacted to gather information related to recent past and reasonably foreseeable future projects.

Past actions in the project vicinity include decades of urban (residential/commercial) development. The more recent projects include the establishment of the "Arts District", where both the White Bear Center for the Arts and Hanifl Performing Arts Center have been constructed. The Arts District is located east of the school site and west of Highway 61. The City of White Bear Lake anticipates continued redevelopment in this area of the community. ISD 624 is also planning building improvements to Lincoln Elementary School, which is located one city block west of Bald Eagle Avenue off 9th Street. The elementary building improvements include the addition of a full-size gymnasium, conference room, extended day office and new cooler. The Rush Line Bus Rapid Transit line is proposed to extend north into the City and includes a planned transit station at 8th Street and Washington Avenue. This transportation and infrastructure improvement is planned to occur within the next 5-8 years. A final project planned within proximity of the school site is the extension of the Bruce Vento Trail corridor being proposed by Ramsey County. The alignment for the trail corridor is still in the scoping and preliminary design phase, but the route is anticipated to be constructed within 1 mile of the school site.

These actions can result in increases in impervious surfaces (parking lots, driveways, trails, buildings), impacts to wetlands or other water resources, reduction of vegetation/wildlife habitat, and can change area traffic conditions.

- C. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.**

Stormwater and Surface Waters

Existing Conditions:

Under existing conditions, stormwater runoff from impervious surfaces generally flows through and across vegetated slopes or surfaces. Two stormwater ponds are located on the site including one near the west side of the bus maintenance/garage facility and another along the north side of the western parking lot.

Impacts from Proposed Action:

The proposed project will result in approximately 14.3 acres of additional impervious surface area due to expanded buildings, parking areas, roads, and sidewalks. As discussed in EAW Item 11.B, the proposed project has design features that collect, convey, and treat runoff in accordance with state and local requirements. New infiltration basins, wet ponds, and underground retention systems are proposed which will improve the existing water quality of the school site runoff. Impacts and proposed mitigation (temporary and permanent BMPs) are discussed in detail in Item 11.B.

Impacts from Other Actions:

Future developments or transportation projects may result in increased impervious surfaces and stormwater quality/quantity (discharge rate) effects. However, these projects will be required to provide mitigation in conformance with NPDES and/or watershed regulations, whereby minimizing stormwater/surface water impacts.

Cumulative Potential Effects:

State and local surface and groundwater management regulations require mitigation be provided in conjunction with proposed development projects. Given the design standards and management controls available for protecting the quality of surface waters, it is likely that potential impacts of the project, along with other future actions, will be minimized or mitigated to a substantial degree. Therefore, adverse cumulative potential effects on water quality and quantity rates are not anticipated. Furthermore, many of the existing parking lots drain directly to wetlands with no treatment. Following construction of the school expansion, most impervious areas will direct runoff to a treatment system, which will be a considerable improvement from the existing conditions.

Wetlands:

Existing Conditions:

Wetland basins are present in the area, but most wetlands in the vicinity have been altered and/or impacted directly or indirectly over time because of past human settlement/ urban development.

Impacts from Proposed Action:

As described in EAW Item 11.b.iv.a (Surface Waters), the proposed project will place fill in delineated wetland basins, resulting in up to 1.0 acre of permanent wetland impacts. A final determination of wetland impacts will be completed as part of the permitting process and impacts will be mitigated in accordance with state and federal regulatory requirements through wetland banking.

Impacts from Other Actions:

Wetlands in the project vicinity may be affected by anticipated future development and transportation projects. However, these impacts will be mitigated, as required by state and federal regulations.

Cumulative Potential Effects:

Wetlands in Minnesota are protected by Federal law (Clean Water Act – Section 404) and State law (Minnesota Wetland Conservation Act and Executive Orders) that mandate “no net loss” of wetland functions and wetland values. Both federal and state laws require permits and mitigation, therefore, no substantial cumulative wetland impacts are anticipated to result from the ISD 624 school expansion project, plus other foreseeable actions. Standard sequencing (avoidance, minimization, and mitigation) for protecting wetlands and ecological resources has been and will be utilized through the project development process.

Vegetation and Wildlife Habitat:

Existing Conditions:

The study area has experienced substantial urban development which has fragmented and diminished the quantity and quality of natural vegetation in the area that can support an abundance of wildlife.

Impacts from Proposed Action:

The proposed school expansion project will generally impact areas previously developed and/or disturbed. Open space (athletic fields) and developed properties will be used in the expansion plan to accommodate the proposed school additions, expanded parking areas/roads, and new/modified athletic facilities. Known impacts from the project will include loss of trees, grasslands, and wetland habitat.

Impacts from Other Actions:

Other future actions in the cumulative effect geographic study area could result in loss of natural vegetation, wooded areas, wetlands, and wildlife habitat. Local land use planning and preliminary studies required by the City of White Bear Lake and White Bear Township will help avoid and/or minimize potential adverse effects.

Cumulative Potential Effects:

The school expansion project in combination with other foreseeable actions in the area is under the development controls of the local governmental units. Zoning and land use regulations function in part to help protect natural areas as development proposals are brought forth for consideration.

The cumulative effects would include an increase in impervious surfaces, loss of vegetation and wildlife habitat. However, implementation and enforcement of land use regulations regarding development is anticipated to minimize the overall environmental effect.

Traffic

The project will add traffic to the surrounding intersections and street network. The Traffic Study (**Appendix D**) provides recommendations for improving traffic flow and safety conditions to accommodate the school, which is discussed under EAW Item 18. In addition to the existing and future traffic conditions associated with the high school, the traffic study included traffic conditions related to Central Middle School and other traffic volumes and patterns in the study area. A total of 25 key intersections were analyzed within the traffic study area.

A traffic operations analyses using modeling software was conducted to determine intersection level of service (LOS), delay, and queuing of traffic for the school arrival and dismissal peak hour conditions. As discussed under EAW Item 18, improvements are planned to mitigate potential traffic operational and safety concerns on the surrounding roadway network.

The operational issues expected in this area are due to a combination of existing school traffic with forecasted traffic volume growth due the proposed high school expansion and other traffic growth from the surrounding area. To adequately accommodate the future traffic volumes and provide safe and efficient travel operations, several recommended mitigation improvements have been recommended, which are listed under EAW Item 18.C.

As part of the proposed high school expansion project the White Bear Lake School District will coordinate with the City of White Bear Lake, Ramsey County, and MnDOT on the analysis and recommendations put forth in the traffic study. Based on these discussions, roadway and/or intersection improvements will be further considered, designed, and constructed to address potential cumulative impacts of traffic in the project area.

20. OTHER POTENTIAL ENVIRONMENTAL EFFECTS: if the project may cause any additional environmental effects not addressed by Items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

All known potentially adverse environmental effects are addressed in the preceding EAW items.

RGU CERTIFICATION

The environmental quality board will only accept signed environmental assessment worksheets for public notice in the EQB Monitor.)

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature: Anne E. Kane Date: 1/21/2021

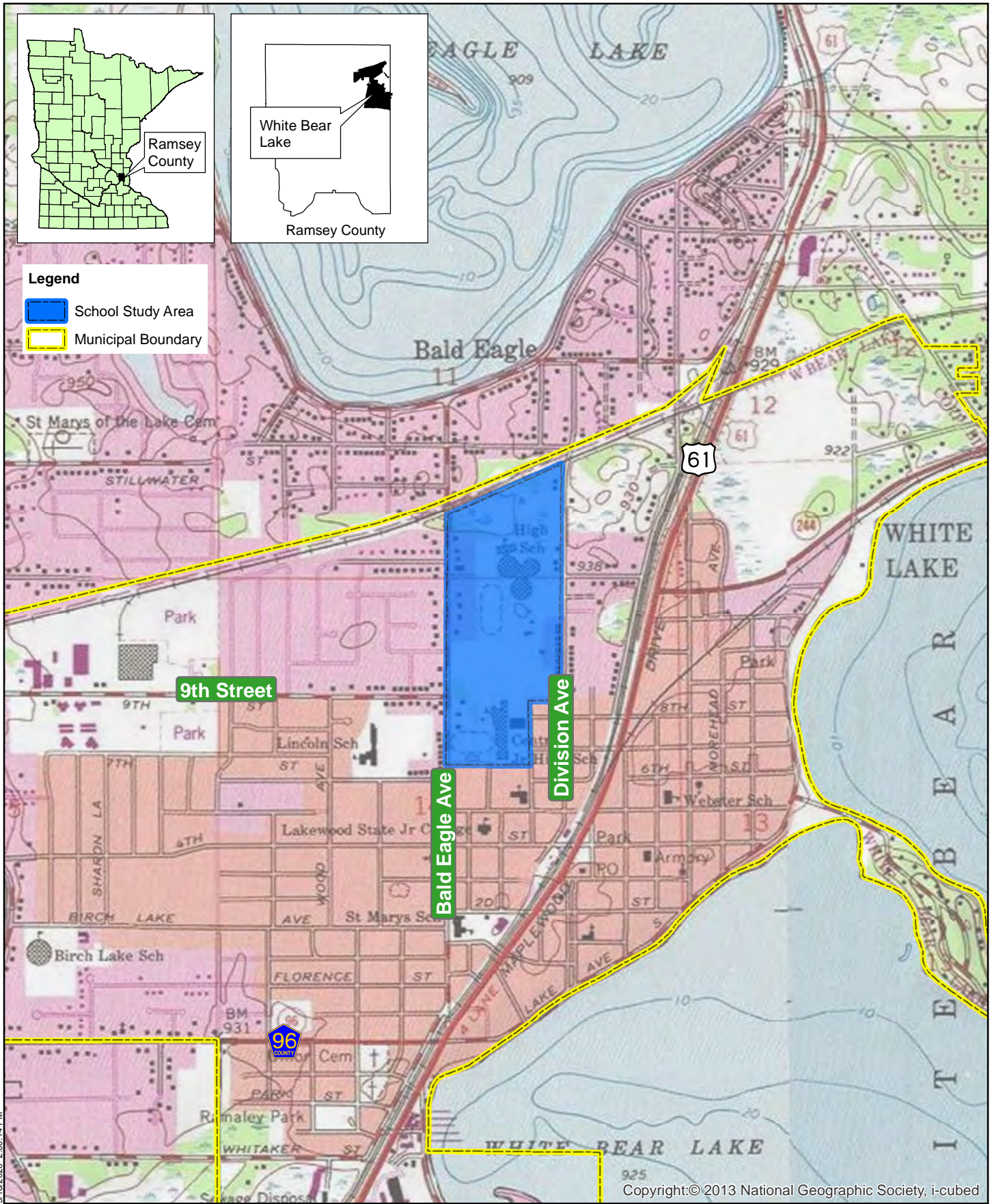
Jurisdiction/Title: City of White Bear Lake, MN /
Community Development Director

Environmental Assessment Worksheet was prepared by the staff of the Environmental Quality Board at the Minnesota Department of Administration, Office of Geographic and Demographic Analysis. For additional information, worksheets or for EAW Guidelines, contact: Environmental Quality Board, 658 Cedar St., St. Paul, MN 55155, 651-201-2492, or <http://www.eqb.state.mn.us>



Appendix A

EAW Figures (1-5)

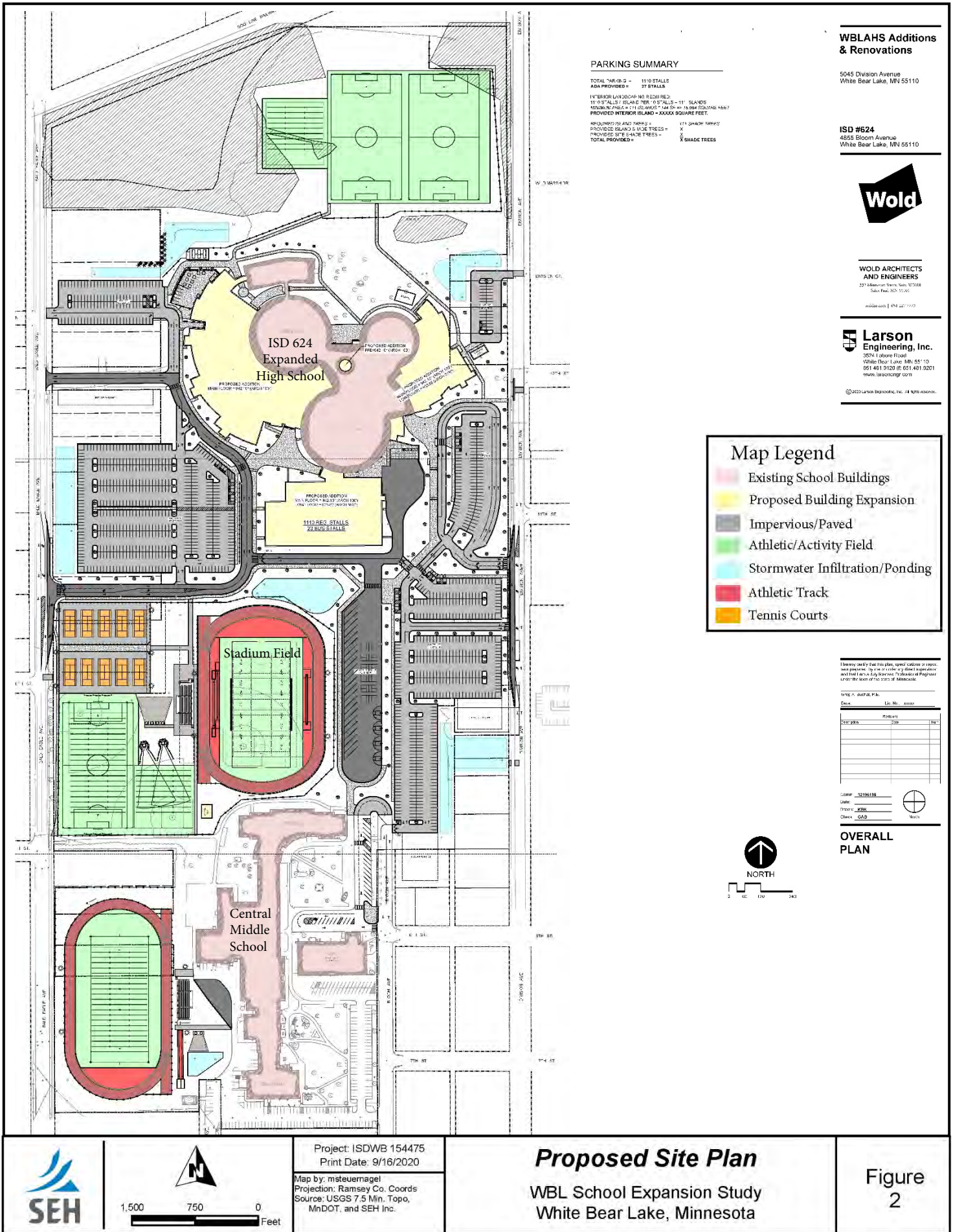
Map Document: X:\F\J\ISDWB\154475\5-final-dsgn\51-drawings\90-GIS\Figure1_SiteLocationMap.mxd
9/16/2020 2:00:14 PM



Copyright:© 2013 National Geographic Society, i-cubed

	 <p>1,500 750 0 Feet</p>	<p>Project: ISDWB 154475 Print Date: 9/16/2020</p> <p>Map by: msteuernagel Projection: Ramsey Co. Coords Source: USGS 7.5 Min. Topo, MnDOT, and SEH Inc.</p>	<p>Site Location Map</p> <p>WBL School Expansion Study White Bear Lake, Minnesota</p>	<p>Figure 1</p>
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This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



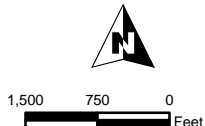
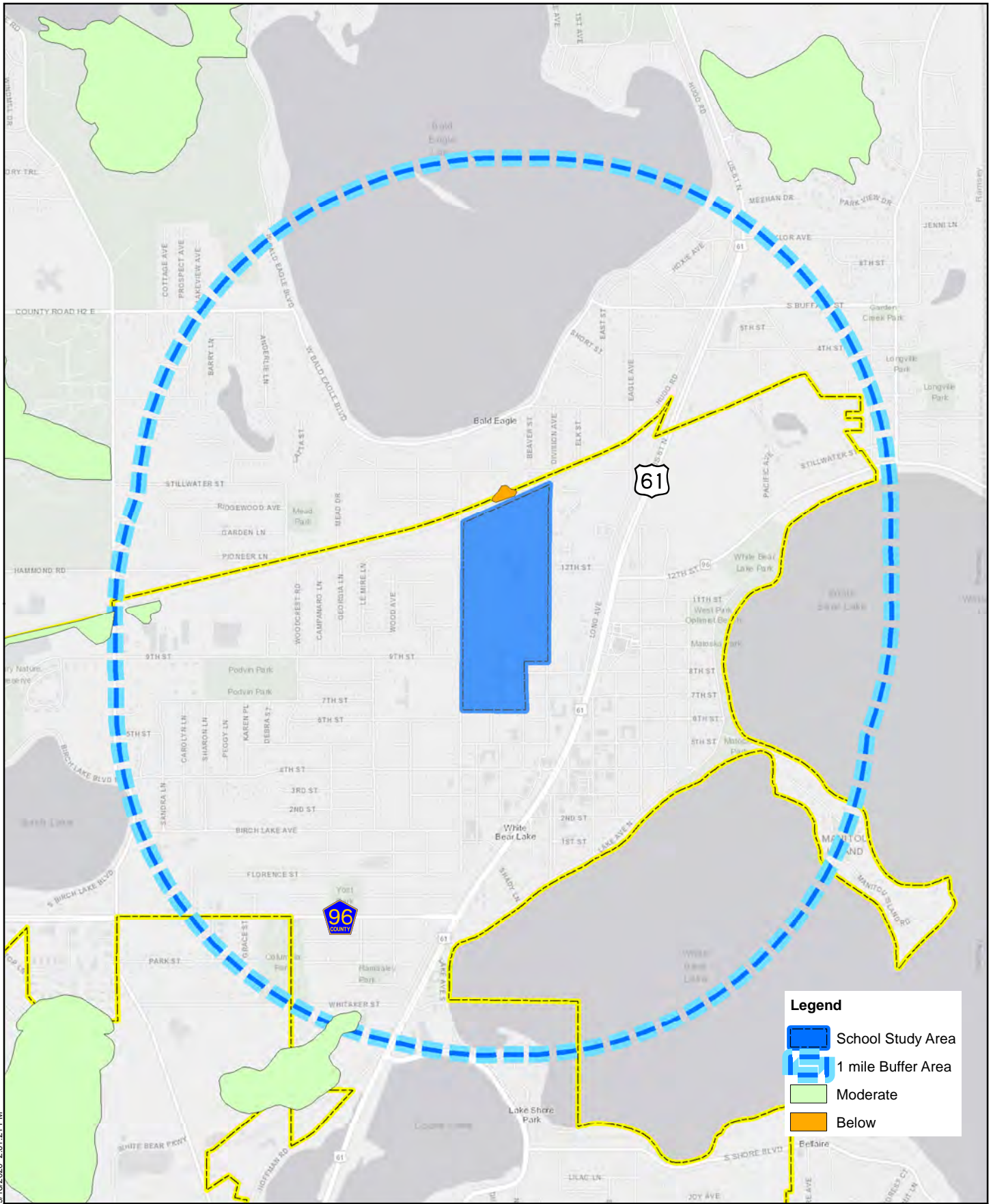


Project: ISDWB 154475
 Print Date: 9/16/2020
 Map by: msteuermagel
 Projection: Ramsey Co. Coords
 Source: USGS 7.5 Min. Topo,
 MnDOT, and SEH Inc.

Soils Map

WBL School Expansion Study
 White Bear Lake, Minnesota

Figure
 3

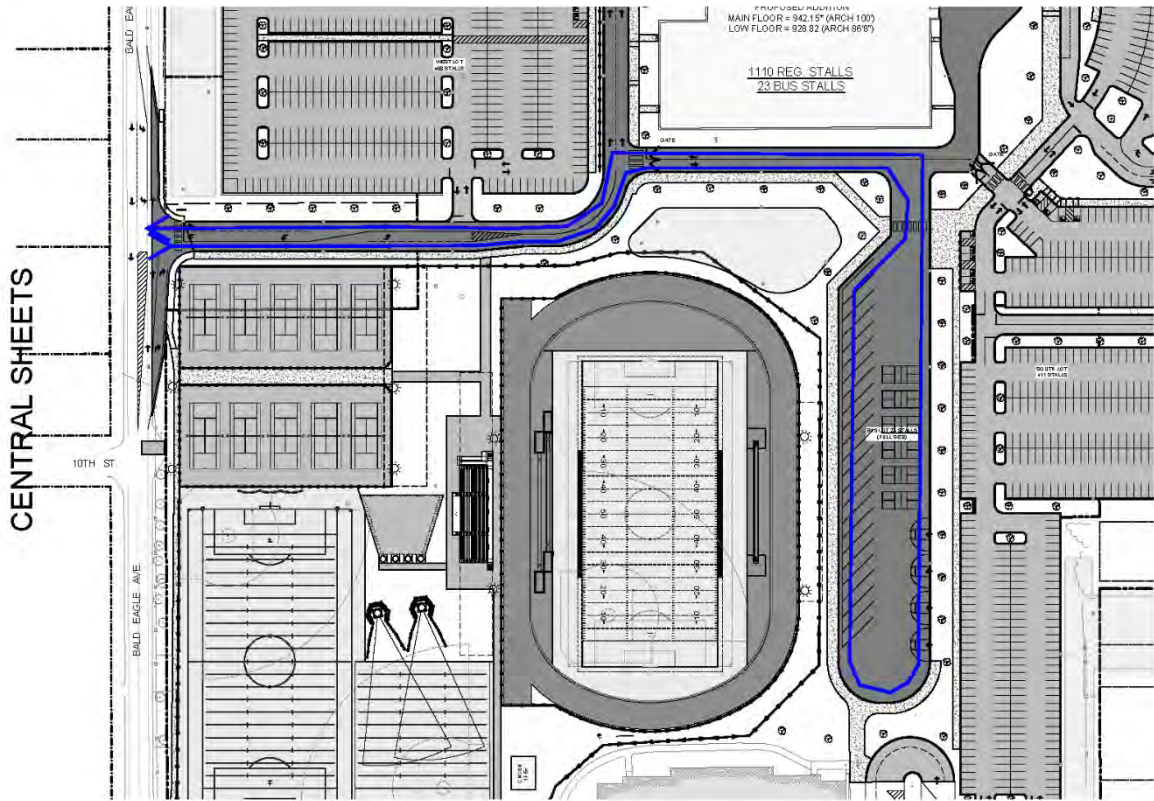


Project: ISDWB 154475
Print Date: 9/16/2020
Map by: msteuernagel
Projection: Ramsey Co. Coords
Source: MnGeoCommons,
MnDNR and SEH Inc.

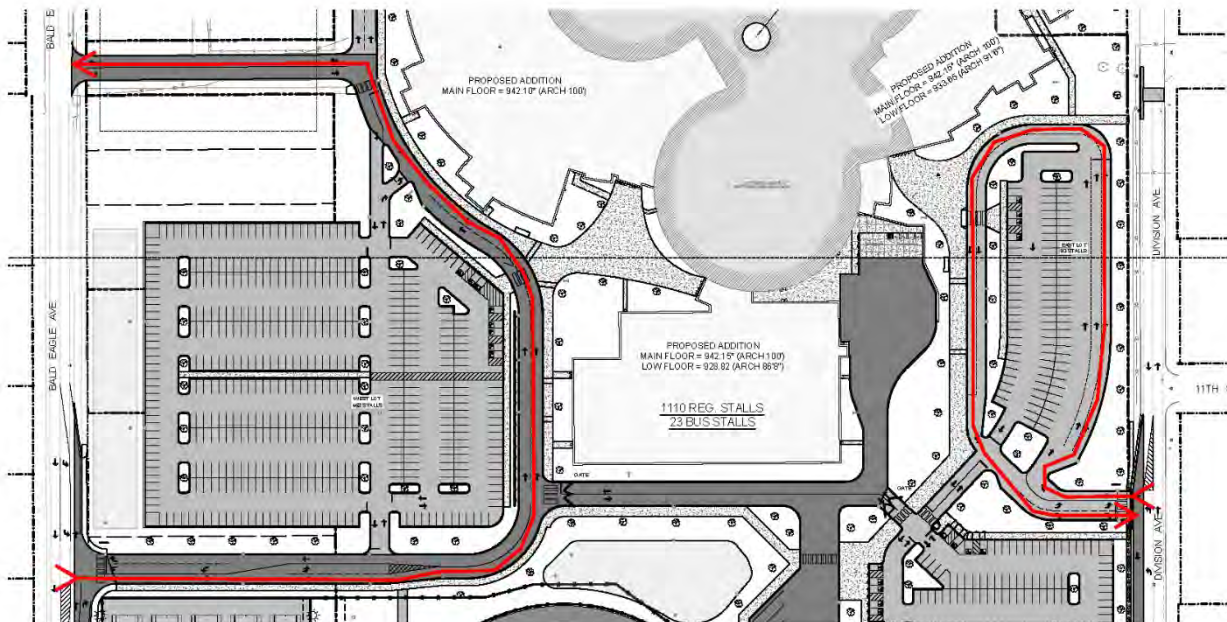
MCBS Sites of Biodiversity Significance

WBL School Expansion Study
White Bear Lake, Minnesota

Figure
4



CENTRAL MIDDLE SCHOOL AND NORTH CAMPUS HIGH SCHOOL SCHOOL BUS ROUTE
- STAGGERED START TIMES FOR MS & HS BUSES



NORTH CAMPUS HIGH SCHOOL VEHICLE DROP OFF/ PICK UP ROUTES
- TWO LOCATIONS



Project: ISDWB 154475
Print Date: 9/16/2020
Map by: mstaunmager
Projection: Ramsey Co. Coords
Source: USGS 7.5 Min. Topo.
MnDOT, and SEH Inc.

Bus Circulation and Student Drop-off Routes

WBL School Expansion Study White Bear Lake,

Figure
5

Appendix B

Wetland Delineation Reports

May 7, 2020

Mr. Patrick Hughes
Rice Creek Watershed District
4325 Pheasant Ridge Dr. NE, #611
Blaine, MN 55449 4539

**RE: Wetland Delineation Addendum
White Bear Lake High School – North Campus
5045 Division Avenue
White Bear Lake, Minnesota 55110
Pinnacle Project Number: EM20201893**

Dear Mr. Hughes,

Pinnacle Engineering Inc. (Pinnacle) was retained by Sunde Land Surveying to conduct a wetland assessment for the White Bear Lake High School – North Campus property. Pinnacle conducted the Level 1 Offsite Wetland Determination in April 2020 of the property located at 5045 Division Avenue in White Bear Lake, Ramsey County, Minnesota, which is within the NE ¼ of NW ¼ of Section 14, Township 30N, Range 22W (Lat: 45.093689°, Long: - 93.011949°). Pinnacle was retained to provide the wetland type of the wetlands and clarify the wetland boundaries.

Pinnacle conducted a site visit on April 30, 2020 to confirm the wetland boundaries of the wetland areas identified in the Level 1 Offsite Wetland Determination. The Site consists of the high school, parking areas, manicured lawns, athletic fields, trails, wooded areas and wetlands. The site property is approximately 66.18-acres in size and has the property identification numbers (PID) of 443022430012, 113022430021, 113022430020, 113022430019, 113022430018, 143022120002, 143022120021, 143022120010, 143022120014, 143022120012, and 143022120011.

To clarify the wetland boundary and type for the wetland impacts, Pinnacle reviewed the Natural Resources Conservation Service (NRCS) Soil Survey, National Wetland Inventory (NWI), Public Waters Inventory (PWI), and the MnTOPO and USGS topographic websites. Pinnacle flagged the wetland boundaries and photographed the wetland areas to document the wetland types. Pinnacle also recorded the wetland boundaries on site with a handheld GPS unit and flagged by the boundary for survey by Sunde Land Surveying.

As reported in the April Level 1 Offsite Wetland Determination, the NWI identified two wetland basins with two wetland types contained within the Site boundaries: two PEM1C

Corporate: 11541 95th Avenue North, Minneapolis, MN 55369
800-366-3406 · Main: 763-315-4501 · Fax: 763-315-4507
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24 Hr. Emergency Response: 1-866-658-8883

wetlands and one PUBH wetland. These wetlands correspond to Wetland 1 and 4. The Soil Survey indicated the Site soil units consist of: Isanti loamy fine sand, depressional (161); Lino loamy fine sand (162); Urban land-Zimmerman complex, 1 to 8 percent slopes (859B); Urban land-Lino complex, 0 to 3 percent slopes (863); Urban land (1039); Aquolls and histosols, ponded (1055). Of the identified soil types, Isanti and Aquolls and histosols are considered hydric soils. These soils correspond to Wetland 1. Also as reported, the PWI identified one public water within the Site boundaries, PWI #62009900. The Site elevation ranges from approximately 940 feet above mean sea level (MSL) in the central portion of the Site to approximately 926 MSL in the northwest, wetland portion of the Site. The Site generally slopes from the central and southern portion of the Site toward the wetlands in the northwestern and central portions of the Site.

The April 2020 field visit identified additional wetland portions to Wetland 1, 2, and 3, and additional wetlands Wetland 5 and 6. Suspect areas 1 and 4, previously identified in the Level 1 Offsite Wetland Determination, were found to be extended portions of Wetland 1 during the site visit. Previously labeled Suspect Area 5 is now considered Suspect Area 1 and was identified as a brush pile. Data was not collected at this location, as dominant upland vegetation and lack of hydrology indicated this area was not a wetland. Additionally, data sheets were not recorded for Suspect Area 2 or 3 due to a prominent presence of common dandelion (*Taraxacum officinale*, FACU) and lack of hydrology.

Standing water was observed in all confirmed wetland areas during the field visit. Wetland 1 extends off site to the west, with the portion found within the Site consisting of type 5, open water (PUBH) wetland areas, surrounded by a type 3, shallow marsh (PEM1C), with a type 1, seasonally flooded basin (PEMA) extending to the athletic field to the east and beyond. Wetland 2 and 4 are consistent with the April Wetland Determination as a type 3, shallow marsh (PEM1C) and Wetland 3 is also consistent as a type 1, seasonally flooded basin (PEMA). Newly identified wetlands, Wetland 5 and 6, are a type 3 and 1, shallow marsh (PEM1C) and seasonally flooded basin (PEMA), respectively.

Wetlands 1, 2, 4, and 5 appear to have multiple inlets and outlets (i.e. culverts, curb cuts, swales). Wetland 1 appears to have at least one culvert along the southeast wetland boundary, presumably to assist with drainage from adjacent Wetland 5. Wetland 5 has a weir located on its western boundary, as well. Wetland 2 appears to have at least one culvert at its southernmost wetland boundary, presumably to receive surficial runoff from Division Street to the east. An additional culvert was noted to the southwest of Wetland 3, presumably to drain stormwater from the high school area to the north adjacent athletic field. Wetland 3, and 6 did not appear to have any direct inlets or outlets.

Wetland 1, 2, 4, and 5 appear to have been, at minimum, partially or wholly excavated or graded, due to the development located at the Site. These wetlands appear to be part of the Site stormwater system, treating and conveying surficial runoff to the regional stormwater system. Wetland 3 and 6 appear to be low-lying basins in the athletic fields, which collect seasonal rainwater.

Mr. Patrick Hughes
Rice Creek Watershed District
Pinnacle Project Number: EM20201893
May 7, 2020
Page 3

The field review conducted April 30, 2020 clarified the wetland types and boundaries of Wetlands 1, 2, 3, and 4 and Suspect Areas 1, 2, 3, 4 and 5 as previously identified in the Level 1 Offsite Wetland Determination of April 2020. The field review identified a total of 6 wetlands (1 additional wetland and inclusion of two suspect areas into Wetland 1) and 3 suspect areas. The identified wetland descriptions are listed above.

If you have any questions or wish to discuss any aspect of the project, please contact me at (763) 760-7413.

Sincerely,

PINNACLE ENGINEERING, INC.

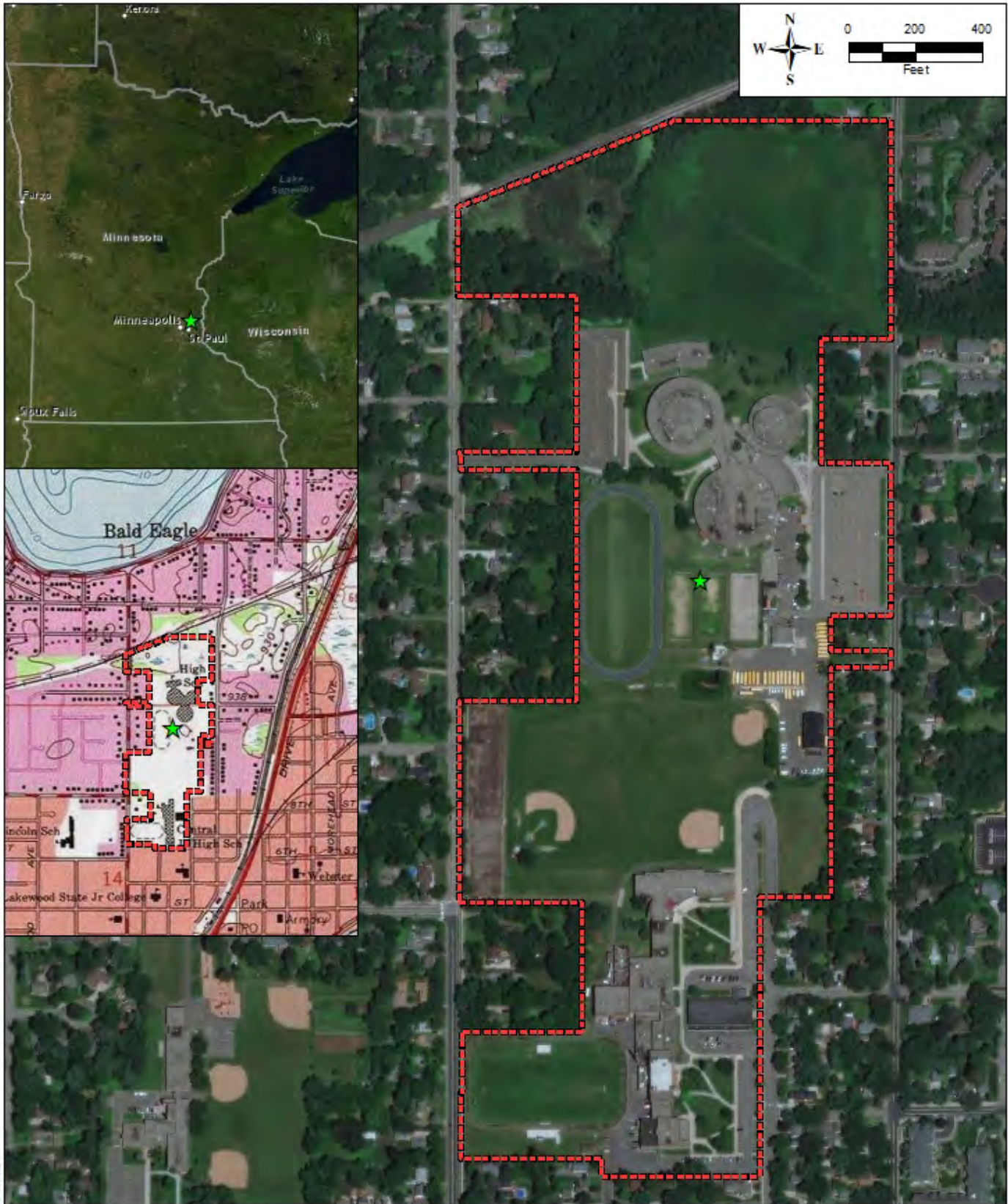
A handwritten signature in black ink, appearing to read 'Breeka Li', written over a horizontal line.

Breeka Li Goodlander
Staff Scientist – Minnesota Certified Wetland Delineator #1344

FIGURES

FIGURE 1

Site Location



File: Figure 1 - Site Location.mxd



11541 95th Ave N.
Minneapolis, MN 55369
(783) 315-4501
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PROJECT NUMBER: EM2020 1893

DRAWN: BG
REVIEWED: ST

DATE: 04/01/2020

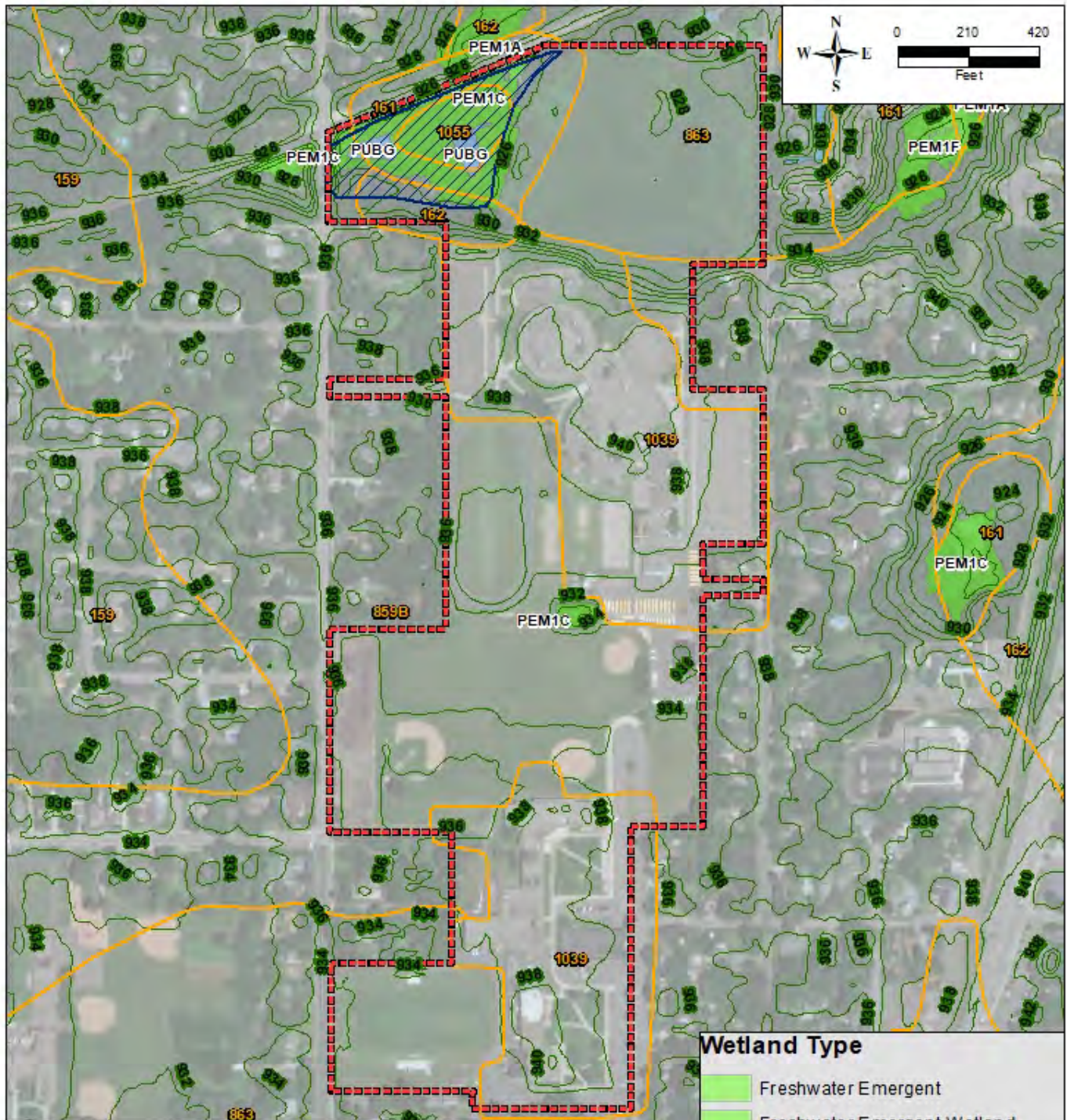
Figure 1.
Site Location

White Bear Lake High School
North Campus
5045 Division Avenue
White Bear Lake, Minnesota 55110

LEGEND

- Site Boundary
- ★ Site Location

FIGURE 2
NWI & PWI Maps, Soil Survey & Topography



161 Isanti loamy fine sand, depressional
 162 Lino loamy fine sand
 859B Urban land-Zimmerman complex, 1 to 8 percent slopes
 863 Urban land-Lino complex, 0 to 3 percent slopes
 1039 Urban land
 1055 Aquolls and histosols, ponded

Wetland Type

- Freshwater Emergent
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

- LEGEND**
- Site Boundary
 - PWI Basins
 - NRCS Soils
 - 2ft Contours
 - PWI Watercourse



11541 95th Ave N.
 Minneapolis, MN 55389
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Figure 2.
Site Resources

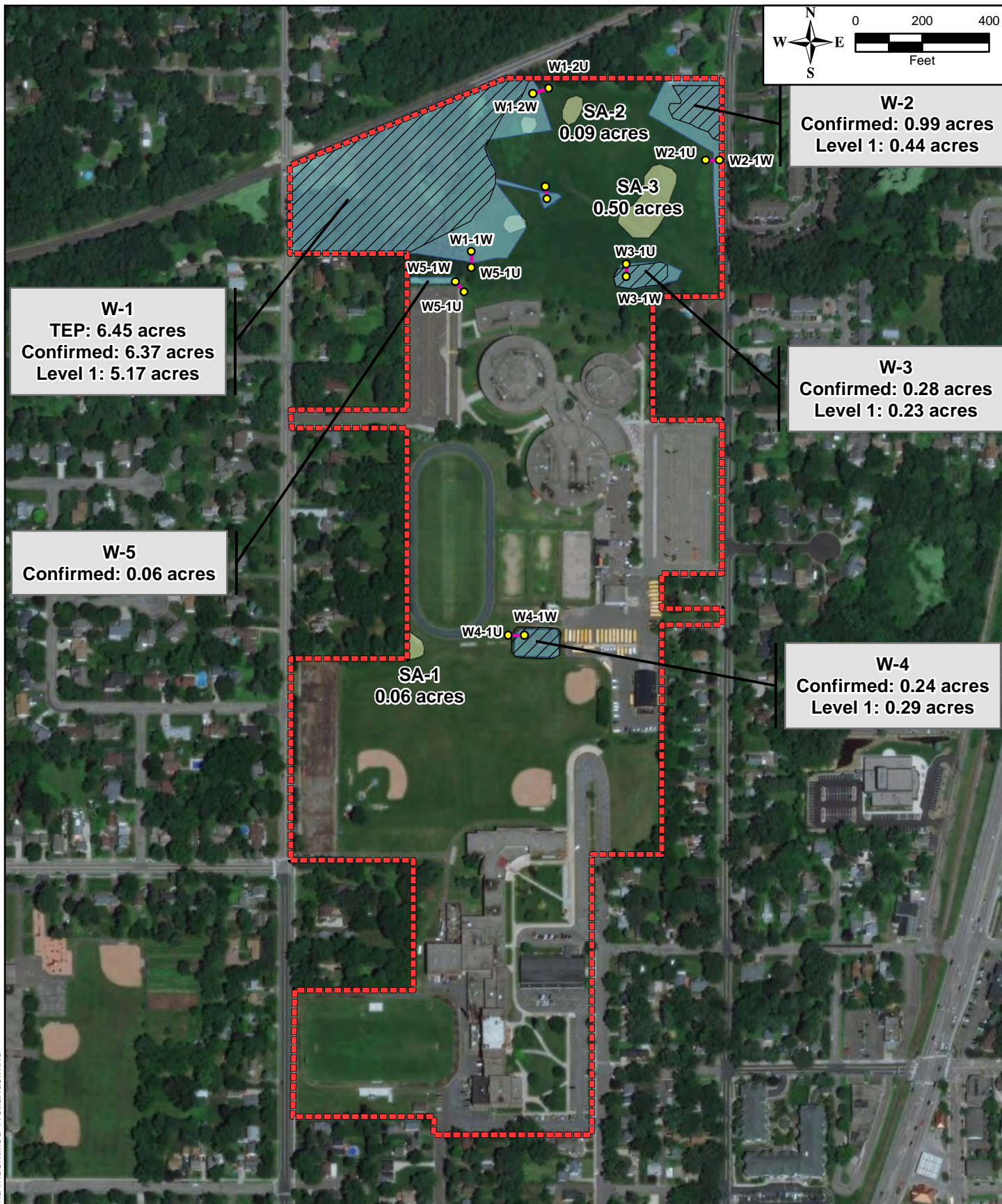
White Bear Lake High School
 North Campus
 5045 Division Avenue
 White Bear Lake, Minnesota 55110

PROJECT NUMBER: EM20201893

DRAWN: BG
 REVIEWED: MB

DATE: 05/01/2020

FIGURE 3
Updated Wetland Locations



11541 95th Ave N.
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PROJECT NUMBER: EM20201893

DRAWN: BG
REVIEWED: ST

DATE: 09/02/2020

Figure 3.
Confirmed Wetlands

White Bear Lake High School
North Campus
5045 Division Avenue
White Bear Lake, Minnesota 55110

LEGEND

- Site Boundary
- Confirmed Wetlands
- Level 1 Identified Wetlands
- Level 1 Suspect Areas
- Sampling Locations
- Transects

APPENDICES

APPENDIX A

Northcentral-Northeast Data Forms

Due to the large number of sheets, copies of the Wetland Data Forms were not included in the EAW. These items are available upon request from the Project Proposer listed under EAW Item 2.

APPENDIX B

Site Photos

Due to the large number of sheets, copies of the Wetland Site Photos were not included in the EAW. These items are available upon request from the Project Proposer listed under EAW Item 2.

October 22, 2020

Mr. Patrick Hughes
Rice Creek Watershed District
4325 Pheasant Ridge Dr. NE, #611
Blaine, MN 55449 4539

RE: Wetland Delineation Addendum II
White Bear Lake High School – North Campus
5045 Division Avenue
White Bear Lake, Minnesota 55110
Pinnacle Project Number: EM20201893

Dear Mr. Hughes,

Pinnacle Engineering Inc. (Pinnacle) was retained by Sunde Land Surveying to conduct a wetland assessment for the White Bear Lake High School – North Campus property. Pinnacle conducted the Level 1 Offsite Wetland Determination in April 2020 of the property located at 5045 Division Avenue in White Bear Lake, Ramsey County, Minnesota, which is within the NE ¼ of NW ¼ of Section 14, Township 30N, Range 22W (Lat: 45.093689°, Long: - 93.011949°). Pinnacle was retained to provide the wetland type of the wetlands and clarify the wetland boundaries. An on-site evaluation and technical evaluation panel (TEP) meeting occurred in April 2020 to verify the wetland boundaries. The purpose of this addendum is to include additional parcels of land that have been incorporated to the Site boundaries.

Pinnacle reviewed the additional parcels for the presence of wetland areas and have included them into the delineated wetland areas. See Figure 1 for revised Site boundaries. The added parcels have property identification numbers (PID) of:

113022430021, 113022430020, 113022430019, 113022430018, 143022120001,
143022120010, 143022120011, 143022120012, 143022120013, 143022120014,
143022120017, 143022240039, 143022130042, 143022130041, 143022130040,
143022120008, 143022120007, 143022120006, 143022120005, 113022430015,
and 113022430014.

Pinnacle reviewed the Natural Resources Conservation Service (NRCS) Soil Survey, National Wetland Inventory (NWI), Public Waters Inventory (PWI), and the MnTOPO and



USGS topographic websites. Pinnacle reviewed historical aerial photos and conducted a site visit to observe the additional parcels.

The October 5, 2020 reconnaissance revealed a small suspect area located at parcel 143022120001, 4997 Division Avenue. Aerial Photos indicate the suspect area is approximately 400 square feet in size. The depressional wetland appears to be a type 1, seasonally flooded basin (PEMA). Standing water was present within the Suspect Area even though only 0.38 inches of precipitation had fallen in the 14 days prior to the Site visit. The location of the suspect area is depicted on Figure 3. Photos of the suspect area are found in Appendix A.

The review of the historical photos presented in the original wetland delineation report (dated April 1, 2020 and amended May 12, 2020) and reviewed on the Ramsey County website: (<https://maps.co.ramsey.mn.us/Html5Viewer/index.html?configBase=https://maps.co.ramsey.mn.us/Geocortex/Essentials/REST/sites/MapRamsey/viewers/MapRamsey/virtualdirectory/Resources/Config/Default>) depict saturated conditions of the suspect area in the later years not in the earlier years after the address was developed. Prior to development the area appears to have been part of a larger agricultural field.

The suspect area is not depicted on the NWI or PWI maps, the soils of the suspect areas are identified as Urban land (1039) which is not a hydric soil, The areas of the suspect area is relatively flat according to the topographic map. Additionally, the suspect area appears only in the later years of the ariel photograph review. This area may be an incidental wetland area where the area has taken on characteristics of a wetland.

If you have any questions or wish to discuss any aspect of the project, please contact me at (612) 432 5590.

Sincerely,

PINNACLE ENGINEERING, INC.

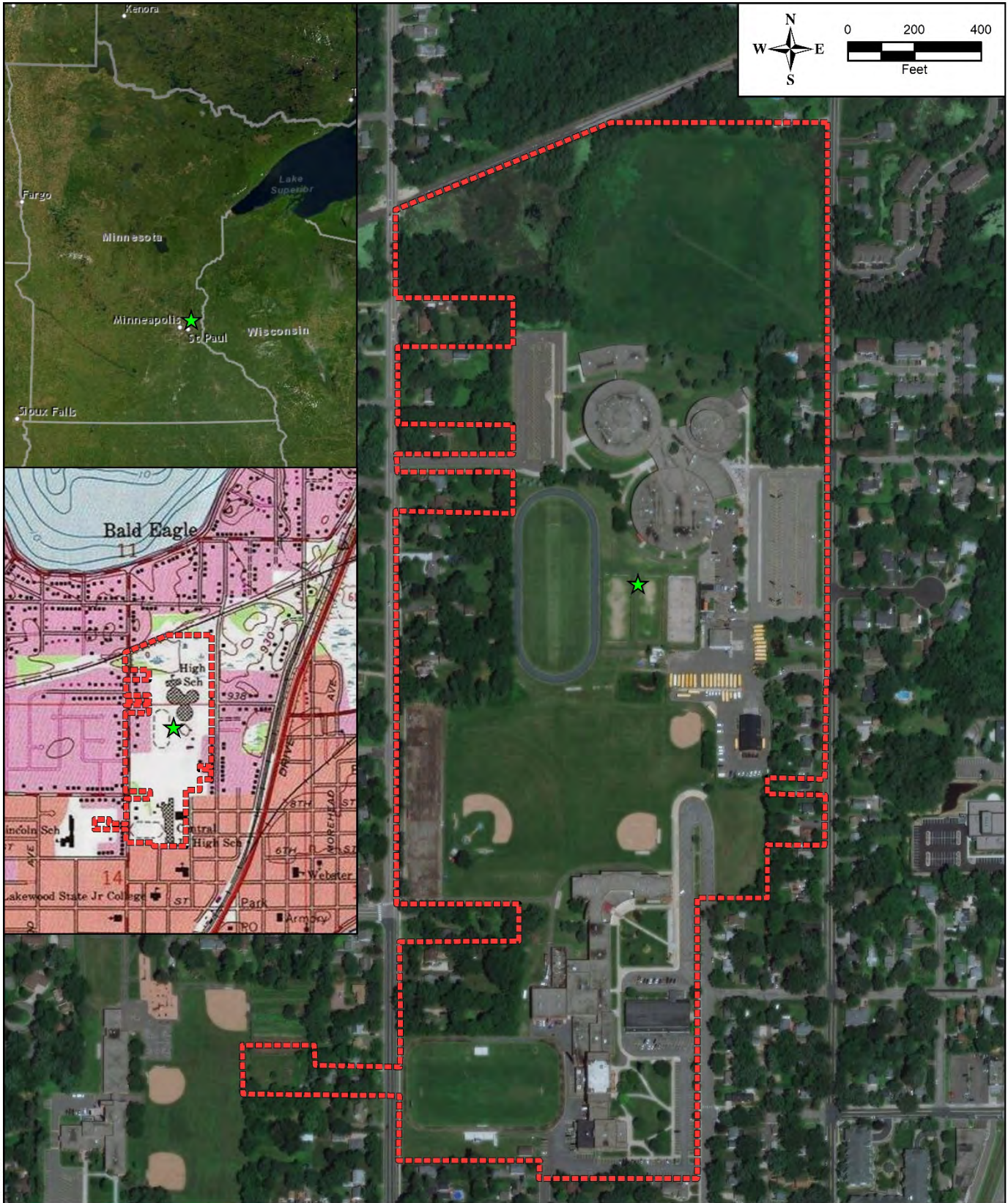
A handwritten signature in black ink, appearing to read "Scott Thelen", written over a horizontal line.

Scott Thelen
Senior Scientist – Minnesota Certified Wetland Delineator #1249

FIGURE 1

Site Location

File: Figure 1 - Site Location.mxd



11541 95th Ave N.
Minneapolis, MN 55369
(763) 315-4501
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PROJECT NUMBER: EM20201893

DRAWN: BG
REVIEWED: ST

DATE: 10/20/2020

Figure 1.
Site Location

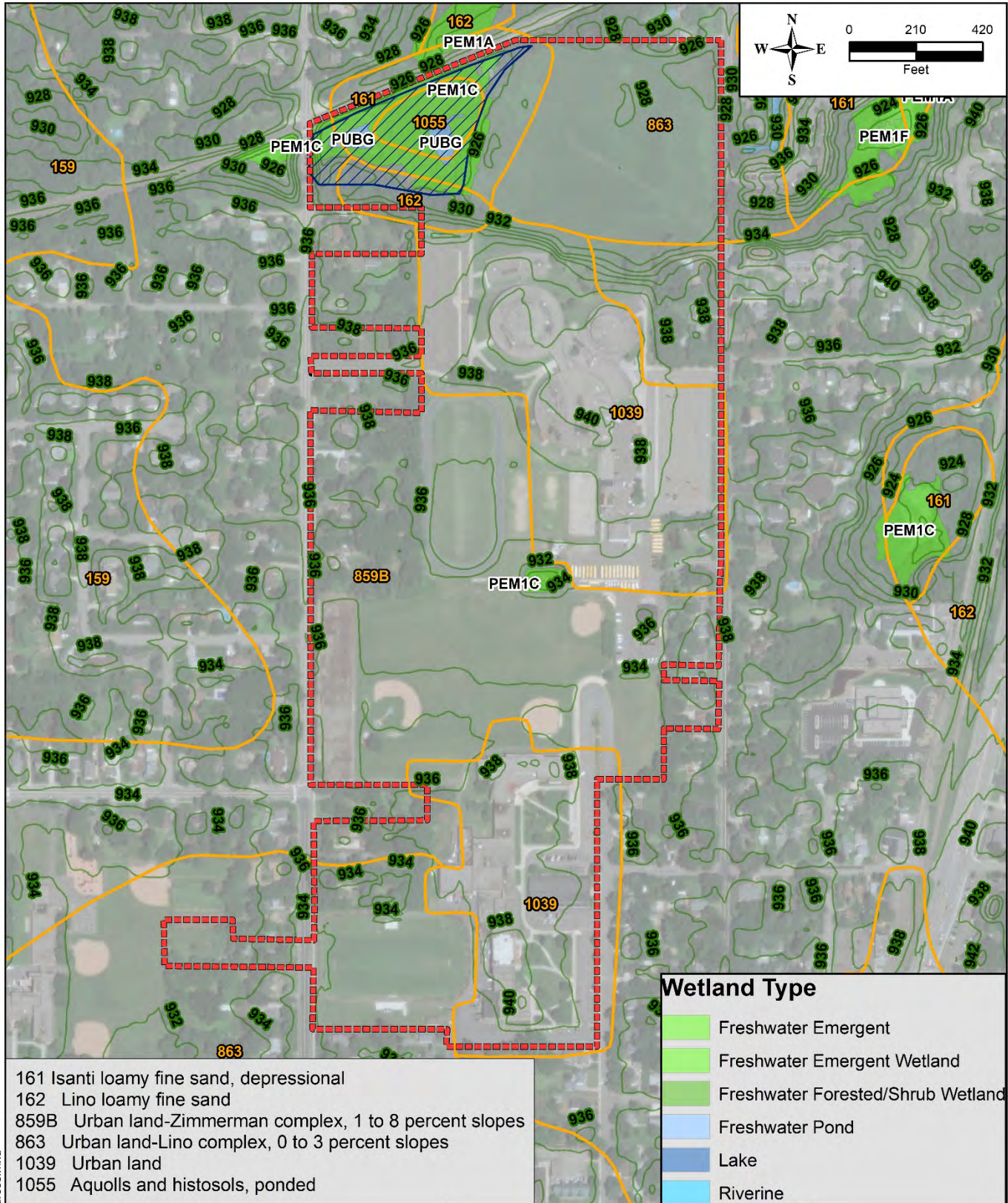
White Bear Lake High School
North Campus
5045 Division Avenue
White Bear Lake, Minnesota 55110

LEGEND

- Site Boundary
- Site Location

FIGURE 2

NWI & PWI Maps, Soil Survey & Topography



File: Figure 2 - Site Resources.mxd



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 Minneapolis, MN 55369
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Figure 2.
 Site Resources

White Bear Lake High School
 North Campus
 5045 Division Avenue
 White Bear Lake, Minnesota 55110

PROJECT NUMBER: EM20201893

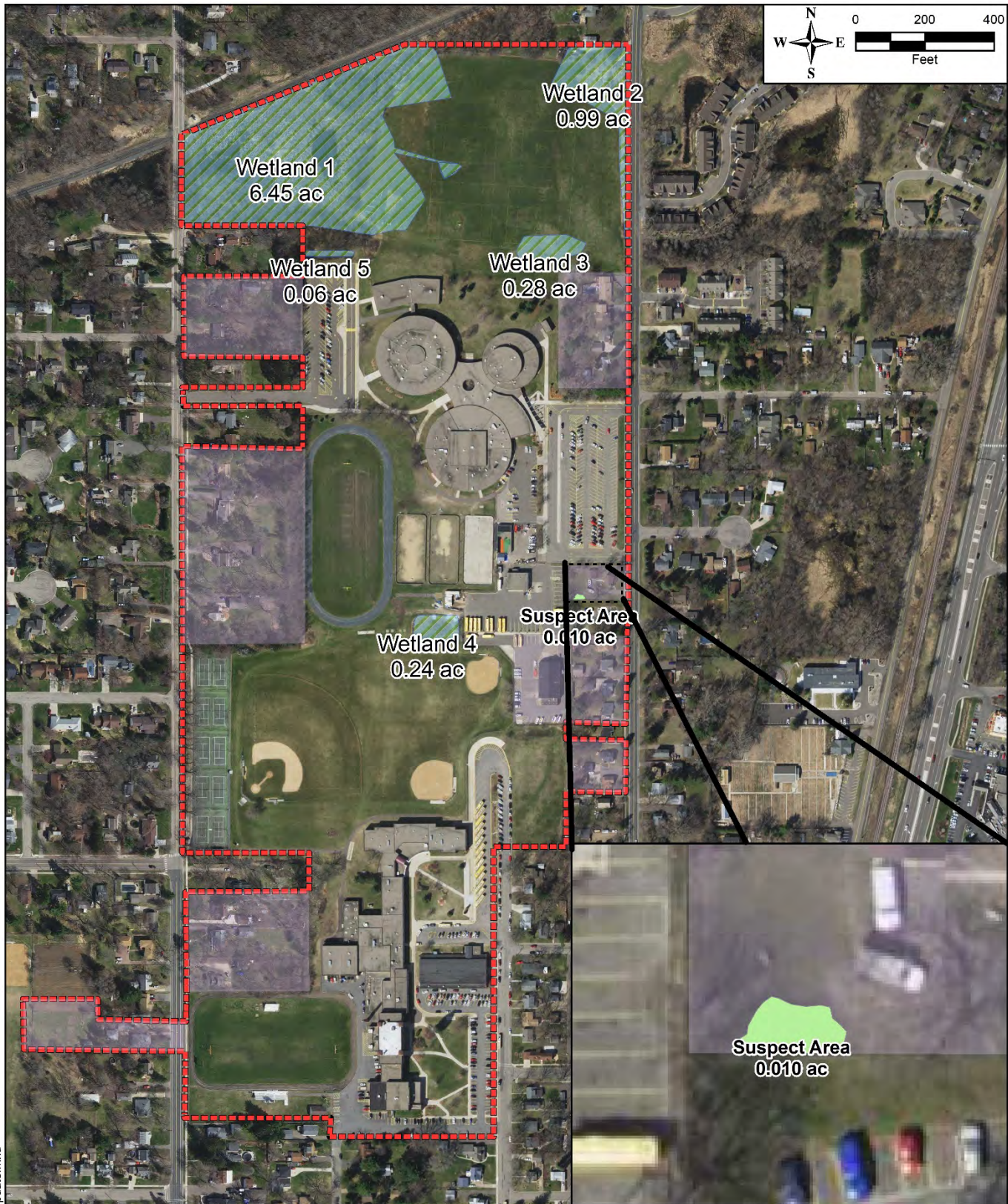
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 REVIEWED: MB

DATE: 10/20/2020

FIGURE 3

Updated Wetland Locations

File: Figure 3 - Wetland Update.mxd



**Pinnacle
Engineering**

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Minneapolis, MN 55369
(763) 315-4501
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PROJECT NUMBER: EM20201893

DRAWN: BG
REVIEWED: ST

DATE: 10/20/2020

Figure 3.
Updated Wetland Areas

White Bear Lake High School
North Campus
5045 Division Avenue
White Bear Lake, Minnesota 55110

LEGEND

- Added Areas
- Site Boundary
- Suspect Area
- Confirmed Wetlands

APPENDIX A

Site Photos



View of Suspect Area at 4997 Division Avenue, looking northwest.



View of Suspect Area at 4997 Division Avenue, looking northeast.

Appendix C

MnSHPO Correspondence

October 14, 2020

Robert Rogers
Short Elliot Hendrickson
3535 Vadnais Center Drive
St. Paul, MN 55110

RE: White Bear Lake High School Expansion Project
5045 Division Avenue
White Bear Lake, Ramsey County
SHPO Number: 2020-2769

Dear Mr. Rogers:

Thank you for consulting with our office during the preparation of an Environmental Assessment Worksheet for the above-referenced project.

Based on our review of the project information, we conclude that there are no properties listed in the National or State Registers of Historic Places and no known or suspected archaeological properties in the area that will be affected by this project.

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36 CFR § 800. If this project is considered for federal financial assistance, or requires a federal permit or license, then review and consultation with our office will need to be initiated by the lead federal agency. Be advised that comments and recommendations provided by our office for this state-level review may differ from findings and determinations made by the federal agency as part of review and consultation under Section 106.

Please contact Kelly Gragg-Johnson, Environmental Review Specialist, at kelly.graggjohnson@state.mn.us if you have any questions regarding our review of this project.

Sincerely,



Sarah J. Beimers
Environmental Review Program Manager

Appendix D

WBLAHS Traffic Impact Study Report



MEMORANDUM

TO: Mr. Tim Wald
Assistant Superintendent for Finance & Building Operation
White Bear Lake Area Public Schools

FROM: Thomas A. Sohrweide, PE (MN), PTOE
Chad Jorgenson, PE (MN), PTOE
Justin Anibas, EIT

DATE: January 11, 2021

RE: White Bear Lake Area High School Expansion Traffic Study - Traffic Study Findings
SEH No. ISDWB 154475

This technical memorandum provides findings related to the traffic study for the proposed expansion of the White Bear Lake Area High School – North Campus and Central Middle School.

This study is considered “Phase 2” and is a follow up to the “Phase 1” study completed in Fall 2019. This Phase 2 study is more comprehensive and involves the analysis of a formal school site plan. At the request of the City of White Bear Lake, Phase 2 also includes more intersections in the area around the school where there could be potential impacts because of the development.

Traffic operations analyses were completed for the year of opening (2024) and full build out (2028) to identify the anticipated impacts and needs for nearby roadways.

Figure 1 illustrates the immediate project area and highlights the high school and middle school sites as well as the study intersections. The findings of this analysis will be useful to understand the development’s future impact at the following intersections.

- Highway 61 at 4th Street
- Highway 61 at 7th Street
- Highway 61 at 8th Street
- Highway 61 at Highway 96
- Highway 61 at Buffalo Street
- Long Avenue at 8th Street
- Washington Avenue at 8th Street
- Division Avenue at 7th Street
- Division Avenue at 8th Street
- Division Avenue at both High School Accesses (Existing and Future locations)
- Bloom Avenue at 4th Street
- Bloom Avenue at 5th Street
- Bald Eagle Avenue at 4th Street
- Bald Eagle Avenue at 5th Street
- Bald Eagle Avenue at 9th Street
- Bald Eagle Avenue at Future High School Access
- Bald Eagle Avenue at 12th Street/High School Access
- Bald Eagle Avenue at Stillwater Street
- Bald Eagle Avenue at Bald Eagle Boulevard
- East Bald Eagle Blvd at Park Avenue/Beaver Street
- Division Street at Park Avenue
- Eagle Street at Park Avenue
- East Bald Eagle Boulevard at Buffalo Street
- Eagle Street at Buffalo Street
- Hugo Road at Buffalo Street

EXECUTIVE SUMMARY

The traffic operations of the study intersections were analyzed under 2024 year of opening and 2028 full build school year conditions with two different school start times; the first with a high school start time of 8:30 AM and a middle school start time of 8:00 AM and the second with a high school start time of 7:30 AM and a middle school start time of 8:00 AM. The traffic operations analysis results indicate that shifting the high school start time later into the morning would be beneficial because the school arrival peak hour would have less overlap with the AM peak hour on Highway 61. In Phase 1 of this study it was found that having the high school and middle school start at least 30 minutes apart would reduce the peak 15-minute traffic demands. Though the School District has yet to change their school start times, the analysis finds that a 30-minute gap is important to mitigate peak traffic demands.

Trips were generated for each school using the ITE Trip Generation Manual, 10th Edition. Trips were distributed using the White Bear Lake School District's *Demographic, Housing, & Enrollment Analysis* (dated August 2018), traffic count data and the current school site plan. The *Demographic, Housing, & Enrollment Analysis* report also provided existing and projected school enrollments, which are shown in **Table 1**.

Table 1 – School Enrollment

Scenario	Year	Enrollment	
		High School	Middle School
Existing	2019	1,225	1,270
Year of Opening	2024	2,850	1,350
Full Build	2028	3,476	1,350

Traffic operations analysis concluded that the northbound left turns off of Highway 61 and the minor street approaches to the Highway 61 study signals currently do not receive enough time in the signal cycle. These issues can be improved, but likely not completely eliminated, with a modified school start time, a signal at Highway 61/8th Street, and signal timing improvements along the Highway 61 corridor. Improvements along Highway 61 will need to be coordinated with MnDOT and the Rush Line Project (signal at Highway 61/8th Street).

Traffic operations analysis concluded that long delays and queues are expected on Hugo Road during the school dismissal peak hour. This delay is a function of how much green time eastbound Buffalo Street gets at the Highway 61/Buffalo Street intersection. In order to improve operations for eastbound Buffalo Street (and Hugo Road) a leading eastbound protected phase at the Highway 61/8th Street signal should be added.

When the school site is expanded, 8th Street is expected to carry a large portion of the trips into and out of the school area, as a result the intersection of Highway 61/8th Street will need to operate with a traffic signal and the intersection of Division Avenue/8th Street must be converted into an all-way stop controlled (or mini roundabout controlled) intersection. The intersection of Division Avenue/7th Street should have the same traffic control as Division Avenue/8th Street. 8th Street between Highway 61 and Division Avenue will need to be modified in order to provide acceptable traffic operations for two-way traffic. **Table 2** shows the three 8th Street alternatives analyzed as well as the benefits and disadvantages of each option compared to the existing condition.

Table 2 – 8th Street Alternatives

Alternative	Figure	Total Cross Section	Advantages	Disadvantages
Current Condition		28 ft	-Maintain parking on both sides of 8 th Street	- Unable to maintain acceptable traffic operations - No sidewalk
Alternative 1 – Remove Parking - Add Sidewalk	Figure 15	28 ft	-Least amount of reconstruction - Adds Sidewalk	- No right turn lane at Division - No on-street parking
Alternative 2 – Retain On-Street Parking on South Side - Add Sidewalk	Figure 16	36 ft	- Adds Sidewalk	- No right turn lane at Division - Removes on-street parking on one side
Alternative 3 – Right Turn Lane at Division – Retain On-Street Parking on South Side – Add Sidewalk	Figure 17	48 ft	- Westbound right turn lane at Division - Adds Sidewalk - Best overall operations	- Most reconstruction required/largest cross section - Removes on-street parking on one side

As part of the school's site plan, dedicated right and left turn lanes in the pick-up/drop off access and a left turn lane into the student parking access are required to maintain acceptable traffic operations on Division Avenue. Dedicated right and left turn lanes are recommended along Bald Eagle Avenue at the main student entrance just north of 9th Street.

There is currently a lack of pedestrian facilities north of 12th Street on Bald Eagle Avenue and Division Avenue/Street as well as on 8th Street. There are currently no specific bicycle accommodations on Division Avenue/Street, 7th Street or 8th Street. The following pedestrian and bicycle accommodations are recommended to improve pedestrian and bicycle safety and accessibility to the school site (see **Figure 18**).

- Add sidewalk/trail on the south side of 8th Street between Highway 61 and Bloom Avenue
- Add sidewalk/trail on the east side of Bald Eagle Avenue from 12th street to Bald Eagle Boulevard
- Add sidewalk/trail on the west side of Division Avenue/Street from 12th Street to Park Avenue
- A marked, mid-block crossing should be added to connect the sidewalk on the west side of Division Avenue to the planned White Bear Lake Art Center parking lot on the east side of the Division Avenue. This crossing should occur south of the school area where Division Avenue is a 2-lane roadway to reduce the pedestrian crossing distance and should have crosswalk warning and advance warning signs.
- Crosswalks should be marked at all stop-controlled roadway and access driveway crossings along Division Avenue and Bald Eagle Avenue to increase the visibility of the pedestrian crossing and improve pedestrian safety.
- Any uncontrolled marked crosswalks along Division Avenue and Bald Eagle Avenue should have crosswalk warning and advance warning signs to improve pedestrian safety.
- Any uncontrolled crossings north of the school on Division Avenue or Bald Eagle Avenue should be further investigated with a sidewalk feasibility study.

The current school site plan, which has gone through many design iterations, meets many of the design guidelines and best practices outlined in the Texas Transportation Institute's *Operations and Safety Around Schools: Overview of Project Activities and Findings* report in order to provide safe and efficient operations for all modes of travel within a school site.

Currently, some of the school buses enter the school area by making a northbound left turn off of Highway 61. As required by law, the buses stop for the railroad crossing. Because of the location of the crossing, the buses stop in the intersection. When multiple buses make turns off of Highway 61 at the same intersection, all of the buses being required to stop slows the flow of those left turn movements and increases the queues and delays for other vehicles turning left off of Highway 61. In order to avoid this issue and northbound left turning vehicles moving as efficiently as possible along Highway 61, the school will establish bus routing that avoids use of left turn lanes on northbound Highway 61 at 7th and 8th Streets. Furthermore, all regular attendance school busses will enter and exit the high school site off Bald Eagle Avenue and will travel through the site as shown in **Figure 21**. The school bus pick up/drop area on the high school site will serve buses for both the Middle and High Schools.

DATA COLLECTION

Due to the health pandemic and its impact on school operations in Spring and Fall of 2020, current traffic turning movement volumes were not able to be collected as part of this study. However, 2019/2020 turning movement count data for the following intersections were used in this study. All of the counts used occurred during school days.

- Highway 61 at 4th Street (October 2019 – Signal Timing Study)
- Highway 61 at 7th Street (October 2019 – Signal Timing Study)
- Highway 61 at 8th Street (January 2020 – WBL Art Center Study)
- Highway 61 at Highway 96 (October 2019 – Signal Timing Study)
- Highway 61 at Buffalo Street (October 2019 – Signal Timing Study)
- Long Avenue at 8th Street (January 2020 – WBL Art Center Study)

In order to estimate existing school year traffic demands for the remaining study intersections, StreetLight data was used. StreetLight is a “big data” online platform that collects traffic and trip data from GPS applications and devices. For this study, the StreetLight data was used with existing AADT (Average Annual Daily Traffic) information from MnDOT in order to estimate hourly traffic demands throughout the day. The hourly traffic demand estimates using StreetLight Data were then compared to the known volumes along Highway 61 and at 8th St/Long Avenue and adjusted to create an estimate of existing demands.

SEH was granted access to Ramsey County’s StreetLight license through MnDOT’s regional subscription, for the purpose of retrieving estimated existing (2020) school year turning movement demands at the remaining study intersections where recent counts were not available.

The StreetLight methodology consisted of creating origin and destination zones for each entry and exit point at the intersections and collecting weekday (Monday-Thursday) data from September 9, 2019 through November 22, 2019. These dates were used because school was in session and, therefore, the data could be used for estimating school year traffic demands. StreetLight provided device captures of the trips making each movement at the intersections during each hour of the day (total of 24-hours).

The StreetLight data was calibrated by applying a factor to the counts after comparing known AADT data on the roadway segments to the 24-hour StreetLight estimated traffic demands. The StreetLight counts were then balanced and further factored/calibrated using the 2019/2020 turning movement counts along Highway 61 and at 8th Street/Long Avenue.

The final estimated hourly traffic volumes were then converted to 15-minute volumes using the 2019/2020 turning movement counts along Highway 61 and at 8th Street/Long Avenue. 15-minute volumes are important for this analysis because a majority of school trips entering/exiting the site occur within 30 minutes of the start or end of the school day.

SAFETY

Crash data from January 1, 2015 through December 31, 2019 was obtained from MnDOT's crash mapping analysis software (MnCMAT2). The type and severity of crashes were reviewed and crash rates were calculated for each existing study intersection as well as three other intersections within the school area: Division Avenue at Stillwater Street, Bloom Avenue at 7th Street, and Bloom Avenue at 8th Street. There was a total of 147 crashes over the 5 years analyzed at the 28 intersections.

The crash rate at each intersection is expressed as a number of crashes per million entering vehicles (MEV). A critical crash rate is a statistical rate that is unique to each intersection and is based on vehicular exposure and the statewide average crash rate for similar intersections; the critical crash rate provides a statistical threshold for screening intersections safety concerns.

The critical index is the crash rate divided by the critical crash rate, a ratio of the observed crash rate to the critical crash rate. An intersection with a crash rate higher than the critical rate (critical index > 1) can indicate a safety concern at the intersection and the site should be further reviewed; a site with a critical index below 1.0 implies that the site does not deviate significantly from the statewide trends.

Crash severity is separated into five categories based on injuries sustained during the crash

- Fatal – Crash that results in death
- Severity A – Crash that results in a serious injury
- Severity B – Crash that results in a minor injury
- Severity C – Crash that results in possible injury
- Property Damage – Crash that results in property damage only, with no injuries.

The following trends are evident in the 2015-2019 intersection crash data:

Highway 61 Intersections

- 109 total crashes at 5 Highway 61 study intersections.
- Highway 61 at 4th Street had the most crashes with 51 during the 5-year analysis period.
- None of the Highway 61 intersections have crash rates that exceed the critical rate.
- 55 of the 109 crashes (50%) were rear end crashes.
 - 35 (64%) were on Highway 61 and the remaining 20 were on the minor streets.
 - Eastbound 4th Street had the most rear end crashes for minor streets with 12.
- 24 of the 109 crashes (22%) were right angle crashes.
- 83 of the 109 crashes (76%) occurred under daylight conditions.
- 76 of the 109 crashes (69%) occurred when the roadway was dry.
- 46 of the 109 crashes (42%) occurred during the AM (6 to 9 AM) or PM (3 to 6 PM) peak periods.
- There doesn't seem to be a significant trend in crashes based on day of the week or month of the year.
- There were 3 pedestrian and 2 bicycle crashes at the Highway 61 intersections.
 - 2 pedestrian and 2 bicycle crashes at the intersection of Highway 61 at 4th Street.
 - 1 pedestrian crash at the intersection of Highway 61 at 7th Street.

Other Intersections

- 38 total crashes at 23 study intersections
- Bald Eagle Avenue at 4th Street had the most crashes with 8 during the 5-year analysis period. None of the other intersections have more than 5 crashes (1 or less crashes per year).
- The intersection of Bald Eagle Avenue at 9th Street with 5 crashes from 2015 to 2019 is the only intersection with a crash rate that exceeds the critical rate, indicating a possible safety concern.
 - 2 of the 5 crashes were eastbound rear end crashes.
 - 1 crash involved a vehicle backing out of the residential driveway on the east side of the intersection.
 - 3 of the crashes involved wet, snowy, or icy roadway conditions.
- The remaining 21 intersections do not have crash rates that exceed the critical rate.
- 10 of the 38 crashes (26%) were rear end crashes.
- 10 of the 38 crashes (26%) were right angle crashes.
- 31 of the 38 crashes (82%) occurred under daylight conditions.
- 23 of the 38 crashes (61%) occurred when the roadway was dry.
- 21 of the 38 crashes (55%) occurred during the AM (6 to 9 AM) or PM (3 to 6 PM) peak periods.
- There doesn't seem to be a significant trend in crashes based on day of the week or month of the year.
- There was 1 pedestrian crash at the intersection of Division Avenue at the High School Entrance/12th Street and involved a pedestrian crossing the north side of the intersection and was struck by a vehicle that was unable to stop.

Table 3 summarizes the crashes at each intersection by crash severity. The attached **Tables A1 and A2** summarize the crashes at each intersection by severity and general crash diagram.

Table 3 – Crash Analysis Summary

Intersection	Severity						Rate Information		
	Fatal	A	B	C	PD	Total	Crash Rate	Critical Rate	Critical Index
Hwy 61 at 4th St**	0	0	7	5	39	51	0.76	0.97	0.79
Hwy 61 at 7th St**	0	1	0	3	6	10	0.20	1.01	0.20
Hwy 61 at 8th St	0	0	3	0	4	7	0.14	0.35	0.40
Hwy 61 at Hwy 96**	0	0	3	3	17	23	0.48	0.71	0.67
Hwy 61 at Buffalo St**	0	0	1	4	13	18	0.48	0.75	0.64
Long Ave at 8th St	0	0	0	1	1	2	0.34	0.73	0.47
Washington Ave at 8th St	0	0	0	0	0	0	0.00	0.83	0.00
Division Ave at 7th St	0	0	1	0	2	3	0.51	1.07	0.48
Division Ave at 8th St	0	0	0	0	4	4	0.43	0.60	0.72
Division Ave at High School Exit	0	0	0	0	1	1	0.13	0.64	0.20
Division Ave at High School Entrance/12th St	0	0	1	1	0	2	0.26	0.64	0.40
Division Ave at Stillwater St ⁽²⁾	0	0	0	0	0	0	0.00	0.87	0.00
Bloom Ave at 4th St	0	0	0	1	2	3	0.15	0.45	0.33
Bloom Ave at 5th St	0	0	0	0	0	0	0.00	0.94	0.00
Bloom Ave at 7th St ⁽²⁾	0	0	0	0	0	0	0.00	0.80	0.00
Bloom Ave at 8th St ⁽²⁾	0	0	0	0	3	3	0.50	0.72	0.70
Bald Eagle Ave at 4th St	0	0	0	1	7	8	0.38	0.71	0.54
Bald Eagle Ave at 5th St	0	0	0	0	1	1	0.08	0.53	0.15
Bald Eagle Ave at 9th St	0	0	1	0	4	5	0.73	0.68	1.08
Bald Eagle Ave at High School Access/ 12th St	0	0	0	0	0	0	0.00	0.72	0.00
Bald Eagle Ave at Stillwater St	0	0	0	1	3	4	0.52	0.65	0.80
Bald Eagle Ave at Bald Eagle Blvd	0	0	0	0	0	0	0.00	0.99	0.00
Bald Eagle Blvd at Park Ave/ Beaver St	0	0	0	0	0	0	0.00	1.10	0.00
Division St at Park Ave	0	0	0	0	0	0	0.00	0.81	0.00
Eagle St at Park Ave	0	0	0	0	1	1	0.17	1.08	0.16
Bald Eagle Blvd at Buffalo St	0	0	0	0	0	0	0.00	1.67	0.00
Eagle St at Buffalo St	0	0	0	0	0	0	0.00	1.58	0.00
Hugo Rd at Buffalo St	0	0	0	0	0	0	0.00	0.59	0.00
Total	0	1	17	20	108	146			
- **Signalized intersection									
- Bold/Red Shaded indicates a calculated crash rate that is at or exceeding the critical rate									
- (2) Notes non-study intersections included									

TRIP GENERATION

Enrollment estimates and trip distribution was completed based on information in the White Bear Lake School District's *Demographic, Housing, & Enrollment Analysis* report, dated August 2018. The proposed high school and middle school are estimated to have 2,850 and 1,350 students respectively in the study analysis year of opening 2024, and 3,476 and 1,350 respectively in the study analysis full build out year of 2028. For the existing school year analysis, North Campus enrollment of 1,225 and Central Middle School enrollment of 1,270 were used.

The Institute of Transportation Engineer's (ITE) Trip Generation Manual, 10th Edition was used to develop school trips for the AM and PM school traffic peak hours. These trip numbers compare favorably to actual traffic counts taken by SEH at Wayzata High School. **Tables 4 and 5** below summarize the site trip generation estimates for the school's arrival and dismissal peak hours based on 2024 and 2028 student populations.

Table 4 – 2024 School Trip Generation

Land Use	Enrollment	School Arrival Peak Hour			School Dismissal Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
High School	2,850	1,037	445	1,482	282	658	940
Middle School	1,350	423	360	783	217	255	472
Total		1,460	805	2,265	499	913	1,412

Table 5 – 2028 School Trip Generation

Land Use	Enrollment	School Arrival Peak Hour			School Dismissal Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
High School	3,476	1,265	542	1,807	344	803	1,147
Middle School	1,350	423	360	783	217	255	472
Total		1,688	902	2,590	561	1,058	1,619

TRIP DISTRIBUTION

The trip distributions for the high school and middle school are based on the most recent site plans, traffic count data, future housing information from the White Bear Lake School District's *Demographic, Housing, & Enrollment Analysis* report, and routing trends seen in the StreetLight data.

Figure 2 shows the most recent site plan that was used when determining the high school trip distribution. This site plan provides access to six school parking lots: three off of Bald Eagle Avenue, two off of Division Avenue, and one off of Bloom Avenue. Pick up/drop off trips will be allowed on both the east and west side of the building. All buses will enter/exit from Bald Eagle Avenue at the new school access.

For the high school, there is expected to be significantly different trip distribution for trips that will enter/exit the site's parking lots versus pick up/drop off trips. Parking trips will be routed based upon what parking lot they are assigned to (using parking passes), where pick up/drop off trips will use whichever side of the building is more convenient to them. Therefore, separate trip distributions were made for high school parking trips and high school pick up/drop off trips. For this analysis, all vehicles that exit the high school site in the AM peak hour were considered to be drop-off trips and all trips that enter the school site in the school dismissal peak hour were considered pick-up trips (i.e. in the 2028 AM peak hour there are 542 drop off trips and 723 parking trips). For parking lot trips, trips were distributed based on the number of parking spaces in each of the three available lots.

- 896 total student parking spaces
- 468 spaces in the Bald Eagle Avenue lot – 52% of all parking trips
- 278 spaces in the Division Avenue lot – 32% of all parking trips
- 150 spaces in the Bloom Avenue lot – 16% of all parking trips

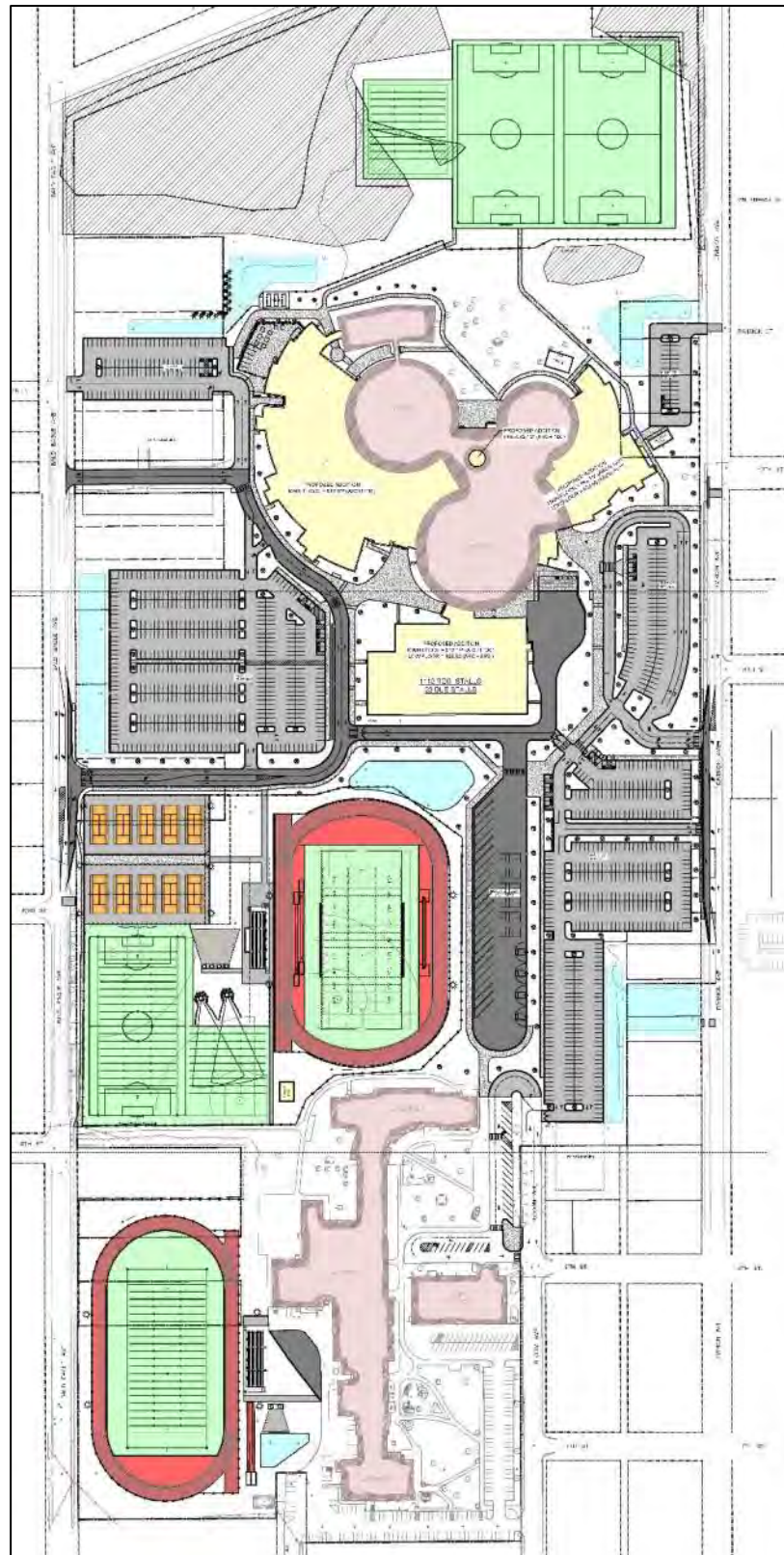
The only difference between the distribution of the high school trips and the current high school site plan is that the analysis assumes only two high school accesses on Bald Eagle Avenue and the most recent site plan has three. However, the third access would only serve to improve traffic operations on Bald Eagle Avenue.

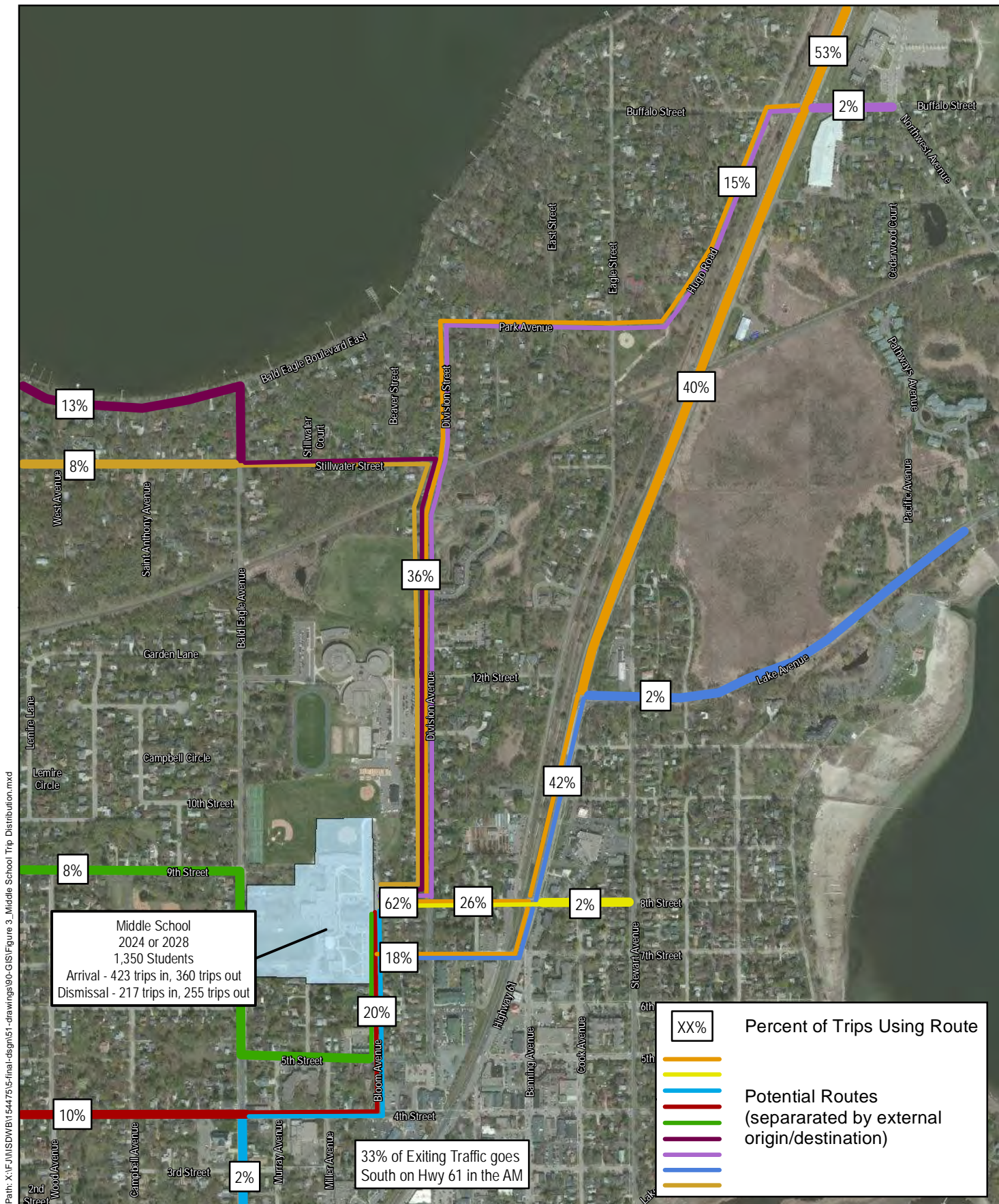
Based on the StreetLight data, it was determined that a large portion of drop-off vehicles exiting the school sites go south on Highway 61, most likely to access Interstate 35E, Interstate 694, Highway 36, or other major routes to the south. Therefore, 33% of all traffic exiting the middle and high schools, which did not enter from the south on Highway 61, is assumed to exit the school sites to the south on Highway 61.

Figures 3, 4 and 5 show the trip distributions for the proposed high school and middle school development.

The distribution of school traffic throughout the school arrival and dismissal peak hours was based on data collected from Wayzata High School, which is similarly sized to the proposed expanded White Bear Lake Area High School. The Wayzata High School traffic data was used to split the trips entering/exiting the school site in each 15 minutes of the peak hour. This was done to ensure that the operations analysis considered that typically most school arrival trips happen within 30 minutes of the start of school and that most dismissal trips happen within 15 minutes of the end of school. These distributions were used for all build scenarios.

Figure 2 – Proposed Site Plan



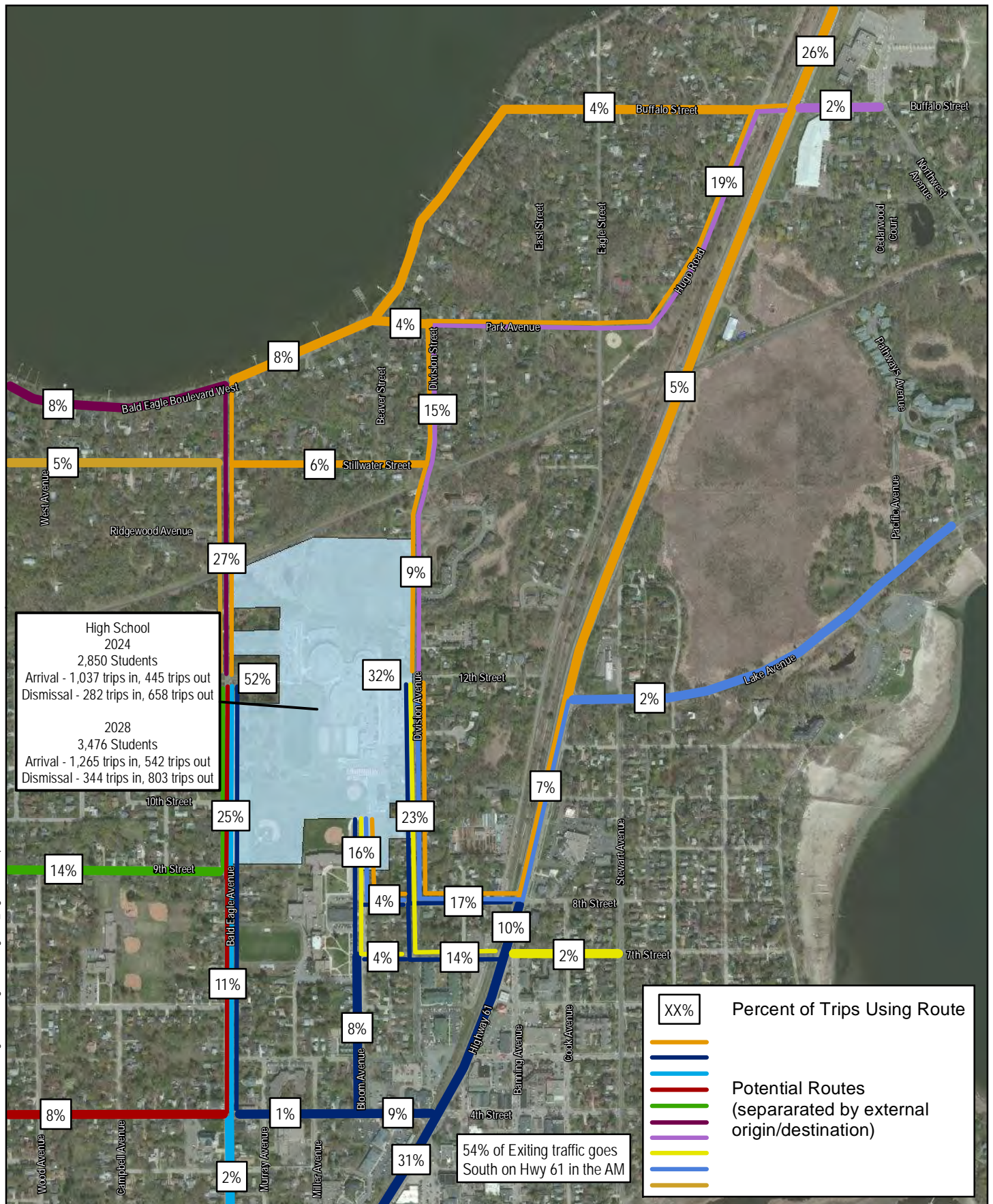


Path: X:\F\UNSD\WB\154475\Final\degm\51-drawings\90-GIS\Figure 3_Middle School Trip Distribution.mxd

		<p>Project: ISDWB 154475 Print Date: 1/4/2021</p> <p>Map by: jdanibas Projection: Ramsey Co. Coords. Source: ESRI Online</p>	<p>Middle School Trip Distribution WBL School Expansion Study White Bear Lake, MN</p>	<p>Figure 3</p>
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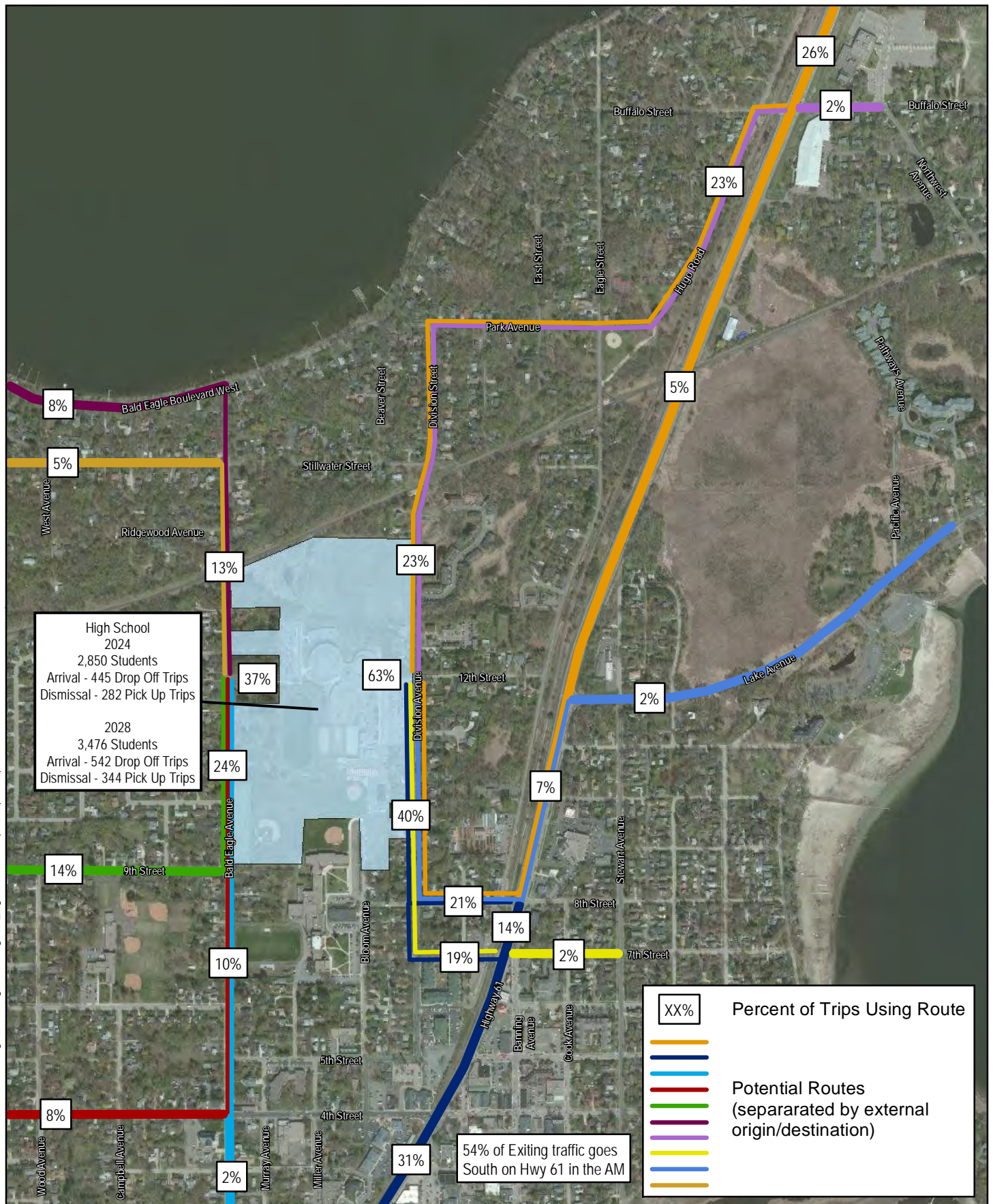
Project: ISDWB 154475
Print Date: 1/4/2021
Map by: jdanibas
Projection: Ramsey Co. Coords.
Source: ESRI Online

High School Trip Distribution

WBL School Expansion Study
White Bear Lake, MN

Figure
4

Path: X:\F\UNISD\WB\154475\Final\degm\51-drawings\90-GIS\Figure 5_High School Pick-Up & Drop Off Trip Distribution.mxd



Project: ISDWB 154475
Print Date: 10/9/2020

Map by: jdanibas
Projection: Ramsey Co. Coords.
Source: ESRI Online

High School Pick Up/Drop Off Trip Distribution

WBL School Expansion Study White Bear Lake, MN

Figure
5

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SCHOOL START AND DISMISSAL TIMES

White Bear Lake High School – North Campus currently has a start time of 7:30 AM and a dismissal time of 2:15 PM and Central Middle School currently has a start time of 8:15 AM and a dismissal time of 3:00 PM. Currently, the school traffic arrival peak hour coincides closely with the AM peak hour of traffic on Highway 61 and the surrounding roadways.

Trends in education currently show a benefit for students with having later high school start times. Therefore, additional start times were considered as shown in **Table 6**. In Phase 1, it was determined that the high school start time should be spaced by no less than 30 minutes from the middle school start time, because a majority of school traffic enters/exits the school within 30 minutes of the school start and end times. Spacing the two school start times by at least 30 minutes will minimize the overlap between high school and middle school traffic.

Table 6 – School Start and Dismissal Time Alternatives

Option	High School		Middle School	
	Start Time	End Time	Start Time	End Time
Existing	7:30 AM	2:15PM	8:15 AM	3:00 PM
Option 1	7:30 AM	2:15 PM	8:00 AM	2:45 PM
Option 2	8:30 AM	3:15 PM	8:00 AM	2:45 PM

Using the three school start time options in **Table 6**, the number of existing trips on Highway 61 were used with the estimated school trips using Highway 61 to compare the combined 2028 middle school, 2028 high school, and Highway 61 trips for each 15 minute period of the school arrival and dismissal peak hour. **Figures 6 and 7** show this comparison.

The graphs show that when moving the high school start time to 8:30 AM, the 15-minute total combined peak volume was lower than when the high school started at 7:30. By moving the high school start time later the school arrival peak hour no longer has as much overlap with the AM peak hour of regular Highway 61 traffic.

During the school dismissal peak hour, the total combined school and Highway 61 traffic is controlled by the roadway traffic along Highway 61. As the dismissal time pushes later into the afternoon the traffic volumes steadily increase along Highway 61 due to the afternoon rush hour starting to begin.

Based on the start time comparison analysis and the operations analysis, the high school start time dictates the peak 15-minutes of traffic volumes during the arrival peak hour and therefore, dictates any mitigations that will be required to facilitate acceptable traffic operations.

Figure 6 – School Start Time Comparison

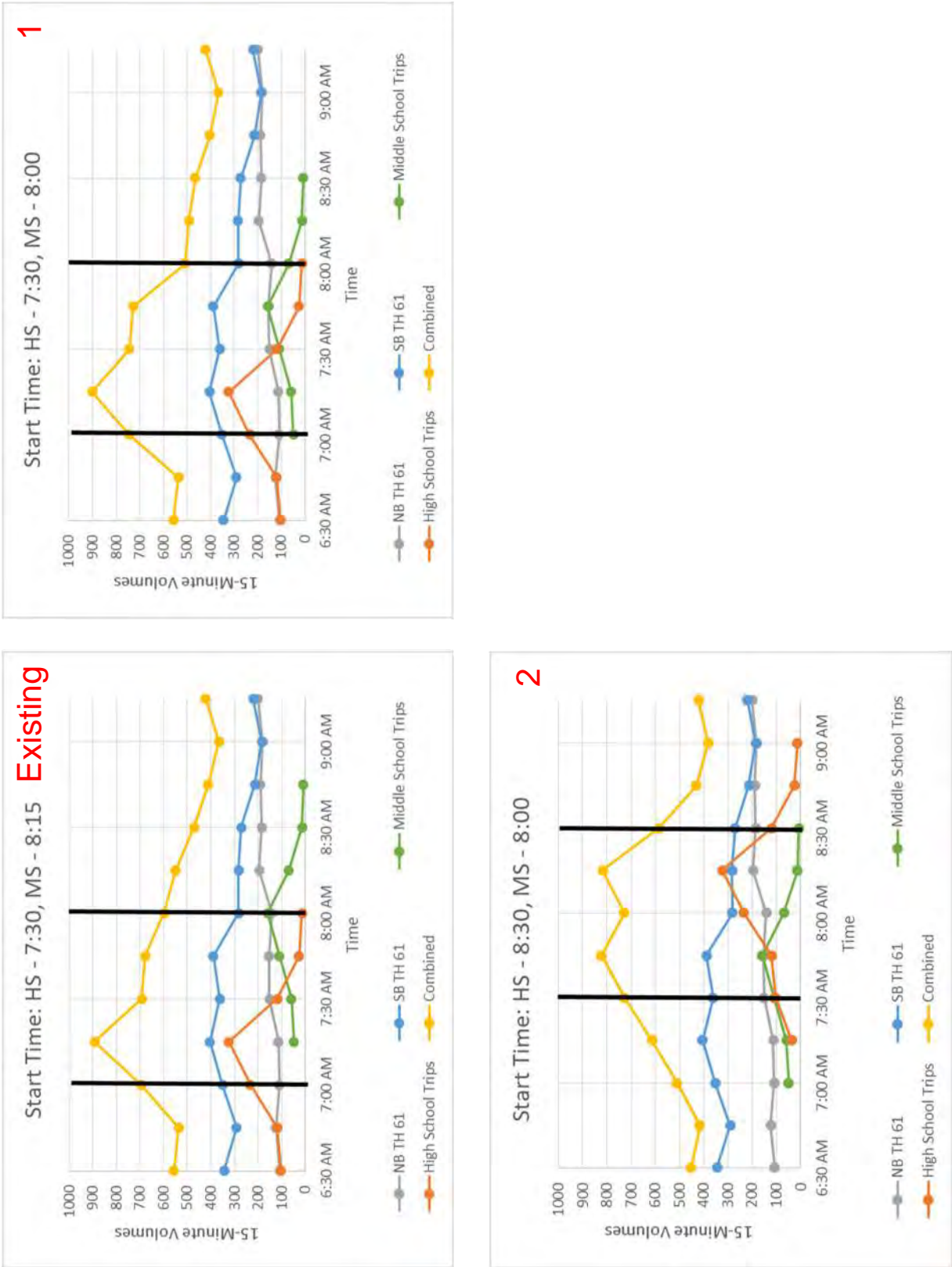
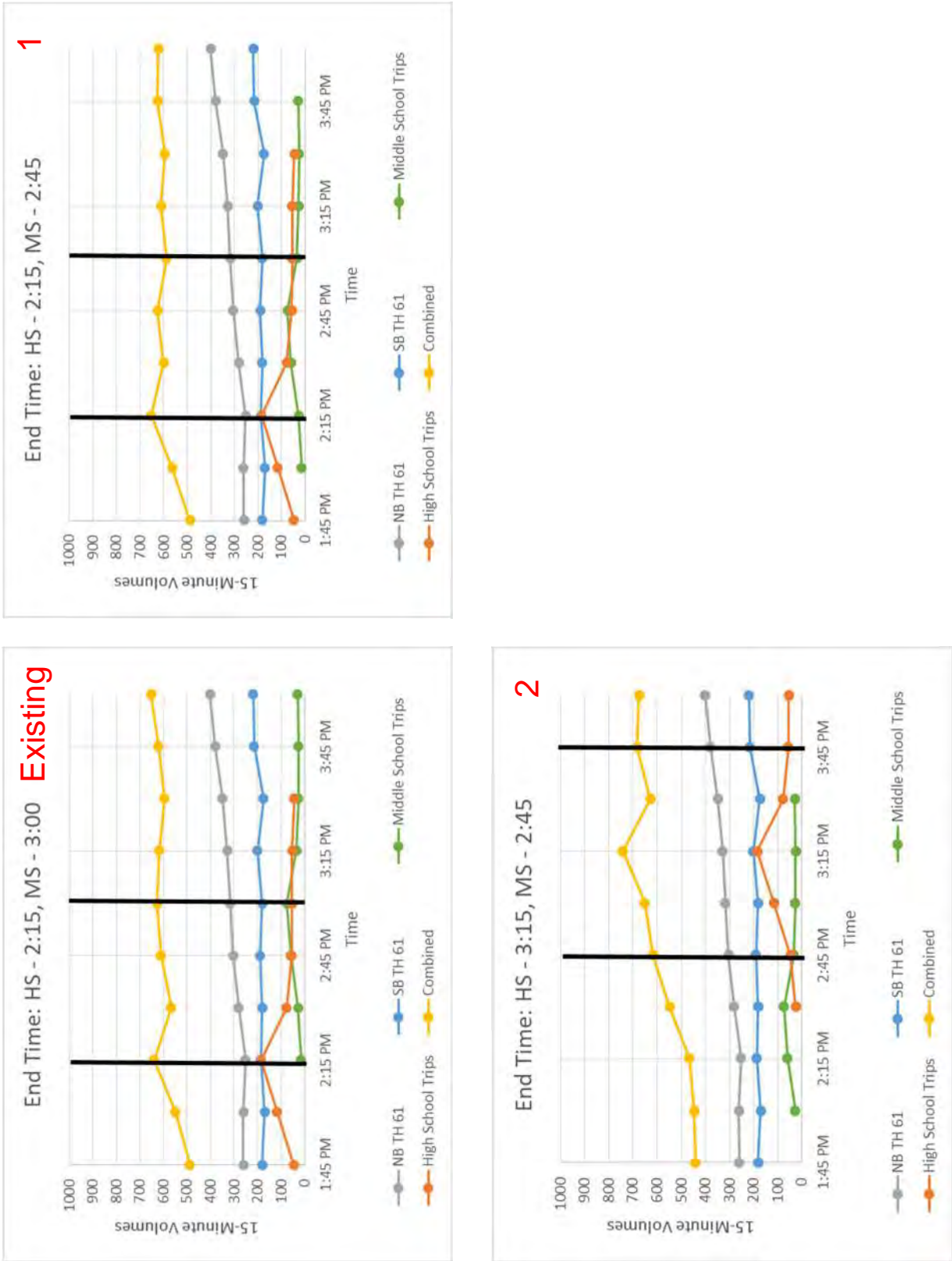


Figure 7 – School Dismissal Time Comparison



TRAFFIC FORECASTING

The daily traffic forecasts for major roadway segments in the study area under No Build conditions were developed based upon historical AADTs provided by the Minnesota Department of Transportation. The resulting annual background growth rates used to forecast traffic volumes to future analysis years of 2024 and 2028 were 2% for Highway 61, 0.5% for Highway 96 and City streets.

FUTURE CONDITIONS

As part of the bus rapid transit (BRT) project, a traffic signal is planned to be installed at the intersection of Highway 61 at 8th Street. This construction is anticipated to occur sometime after the 2024 year of opening for the school, however, this signal is necessary to provide acceptable traffic operations during the school arrival and dismissal peak hour and should be constructed before 2024. This installation of the signal at Highway 61 at 8th Street will need to be coordinated with the Rush Line Project and MnDOT. It was therefore assumed that a traffic signal would be present at the intersection of Highway 61 at 8th Street for all future analysis scenarios.

The future accesses for the school site were based on the most recent school site plan (**Figure 2**). The only difference analysis and the current high school site plan is that the analysis assumes only two high school accesses on Bald Eagle Avenue and the most recent site plan has three. However, the third access would only serve to improve traffic operations on Bald Eagle Avenue.

OPERATIONAL ANALYSIS

Traffic operations analyses were conducted to determine the level of service (LOS), delay, and queuing information for the school arrival and dismissal peak hour conditions of each scenario outlined later in this section. LOS is a qualitative rating system used to describe the efficiency of traffic operations at an intersection. Six LOS are defined, designated by letters A through F. LOS A represents the best operating conditions (no congestion), and LOS F represents the worst operating conditions (severe congestion).

Traffic operations analyses were performed using Synchro/SimTraffic (Version 9) software package for all scenarios. For signalized and unsignalized intersections Synchro/SimTraffic uses the methods outlined in the 2010 Highway Capacity Manual (HCM). LOS for intersections is determined by the average control delay per vehicle. The range of control delay for each LOS is different for signalized and unsignalized intersections. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will experience greater delays than an unsignalized intersection.

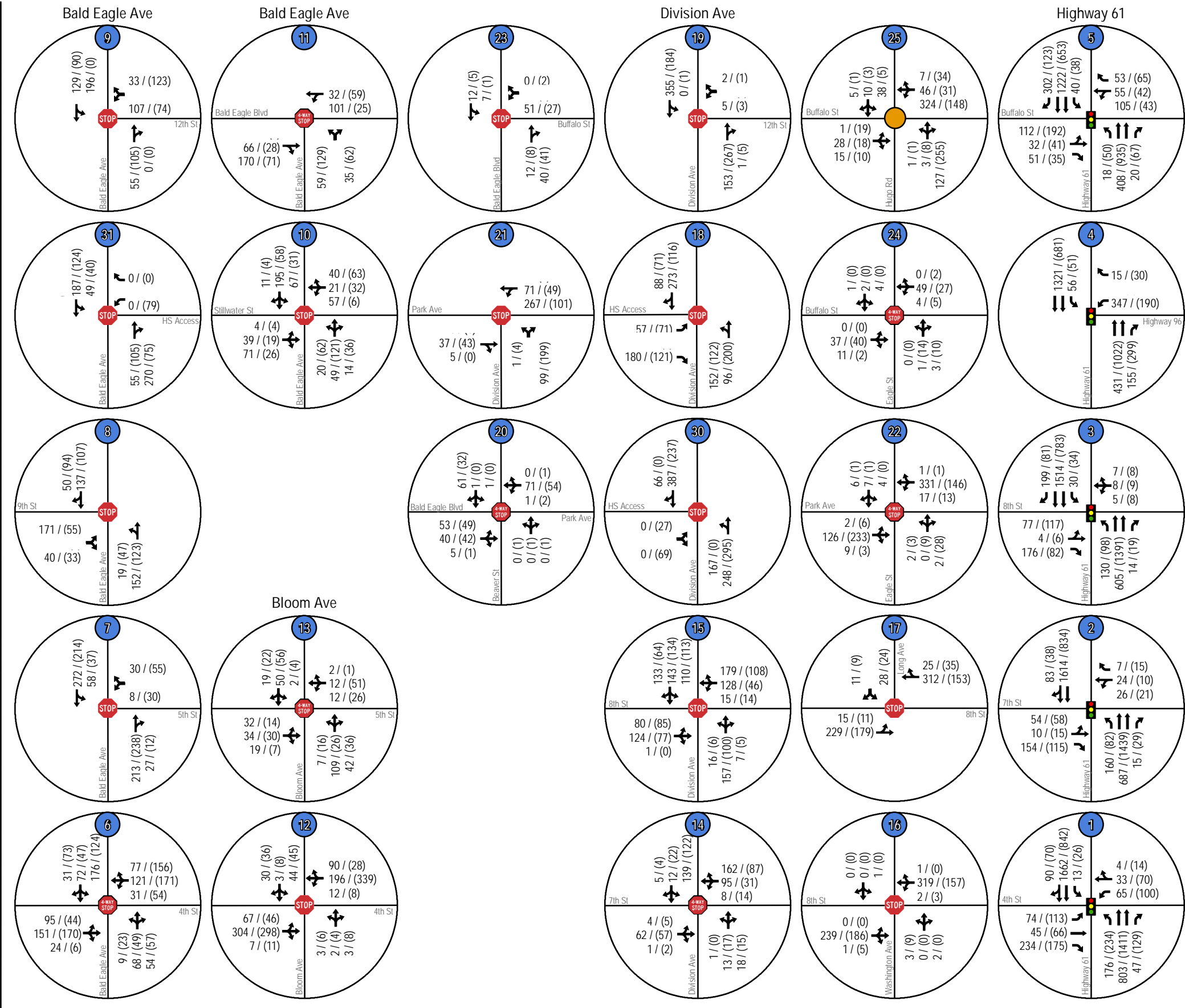
For this project, LOS E or better for all approaches and intersections is considered to be acceptable traffic operations. Movements could be considered to operate acceptably at LOS F if the volume was relatively low (approximately 20 or less) or if the signal cycle length was the cause for the LOS F.

The existing intersection control and roadway geometry was used for all intersections that were analyzed, with the exception of a traffic signal at the intersection of Hwy 61/8th Street. A traffic signal is planned to be installed at this intersection as part of the Bus Rapid Transit project and therefore was included in the 2024 and 2028 analyses. As part of that plan, it is likely that the southbound left turn at 7th Street would be eliminated, thereby allowing for a longer northbound left turn lane at 8th Street.

Due to the close spacing of Hugo Road to Highway 61 on Buffalo Street (approximately 115 ft), the three-way stop controlled intersection at Buffalo Street and Hugo Road (westbound operates freely) does not operate like a typical three-way stop controlled intersection. When the light is green for eastbound Buffalo Street at Highway 61, vehicles do not come to a complete stop at this intersection (especially after waiting in a queue) in order to make the green light. In this case, the intersection operates as more of a three-way yield controlled intersection with a sort of zipper merge for vehicles heading east toward Highway 61. As a result, the intersection was analyzed with different control/geometry than what is actually there in order to try to duplicate how this intersection actually operates. No geometric changes are recommended at this intersection as part of this project.

For comparison purposes and the likely change of high school start times, the following scenarios were analyzed. All scenarios are considered mitigated conditions with the geometric or traffic control changes necessary to provide acceptable traffic operations under that scenarios traffic demands.

- Scenario 1a: 2024 School Year Conditions (8:30 AM HS, 8:00 AM MS)
 - Traffic signal at Highway 61/8th Street
 - New high school accesses on Division Avenue and Bald Eagle Avenue
 - Any additional mitigations needed to provide acceptable traffic operations
 - Forecasted background growth
 - Year of opening enrollment
 - North Campus start/dismiss = 8:30 AM/3:15 PM
 - Central Middle School start/dismiss = 8:00 AM/2:45 PM
 - The volumes for the arrival and dismissal peak hours can be seen in **Figure 8**
- Scenario 1b: 2024 School Year Conditions (7:30 AM HS, 8:00 AM MS)
 - Same as Scenario 1a except the following:
 - North Campus start/dismiss = 7:30 AM/2:15 PM
 - Central Middle School start/dismiss = 8:00 AM/2:45 PM
 - The volumes for the arrival and dismissal peak hours can be seen in **Figure 9**
- Scenario 2a: 2028 School Year Conditions (8:30 AM HS, 8:00 AM MS)
 - Traffic signal at Highway 61/8th Street
 - New high school accesses on Division Avenue and Bald Eagle Avenue
 - Any additional mitigations needed to provide acceptable traffic operations
 - Forecasted background growth
 - Full build out enrollment
 - North Campus start/dismiss = 8:30 AM/3:15 PM
 - Central Middle School start/dismiss = 8:00 AM/2:45 PM
 - The volumes for the arrival and dismissal peak hours can be seen in **Figure 10**
- Scenario 2b: 2028 School Year Conditions (7:30 AM HS, 8:00 AM MS)
 - Same as Scenario 2a except the following:
 - North Campus start/dismiss = 7:30 AM/2:15 PM
 - Central Middle School start/dismiss = 8:00 AM/2:45 PM
 - Any additional mitigations needed to provide acceptable traffic operations
 - The volumes for the arrival and dismissal peak hours can be seen in **Figure 11**



Existing Traffic Control (Includes Hwy 61/8th St Signal)

Minor Street Stop Control

3-way Stop (WB Free)

All-way Stop Control

Traffic Signal

Intersection ID

Existing Geometrics (Includes Hwy 61/8th St Signal Project)

School Arrival Peak Hour Volume

School Dismissal Peak Hour Volume

Project: ISDWB 154475

Print Date: 10/9/2020

User Name: jdanibas

Projection: NAD 1983 HARN Adj MN Ramsey Feet

Source:

2024 Traffic Volumes (8:30 HS, 8:00 MS)

WBL School Expansion Study

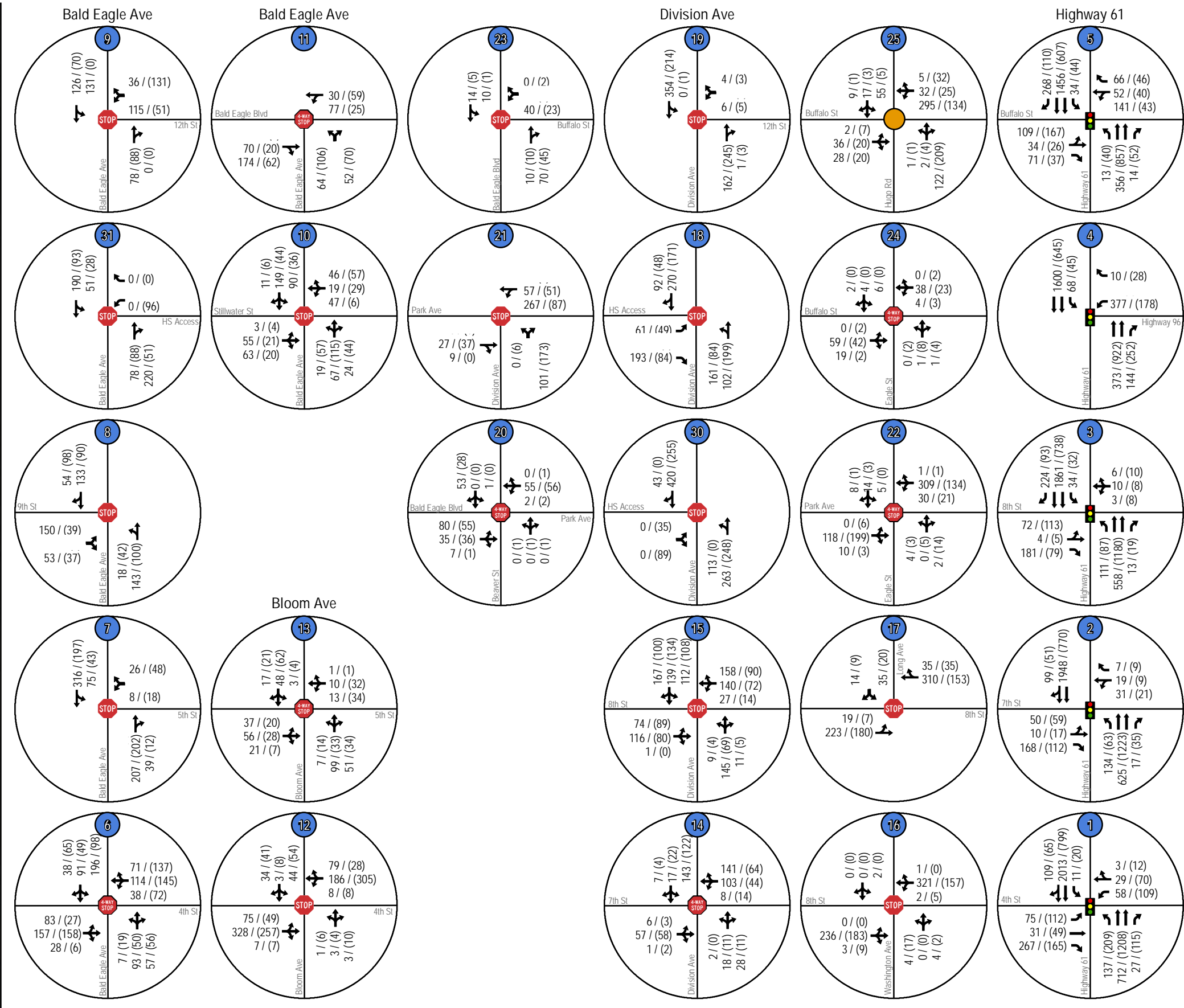
White Bear Lake, MN

Figure 8

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Path: X:\F\MSDWB\154475\5-final-dsgn\51-drawings\90-GIS\Figure 9 - 2024 Traffic Volumes (7:30 & 8:00).mxd

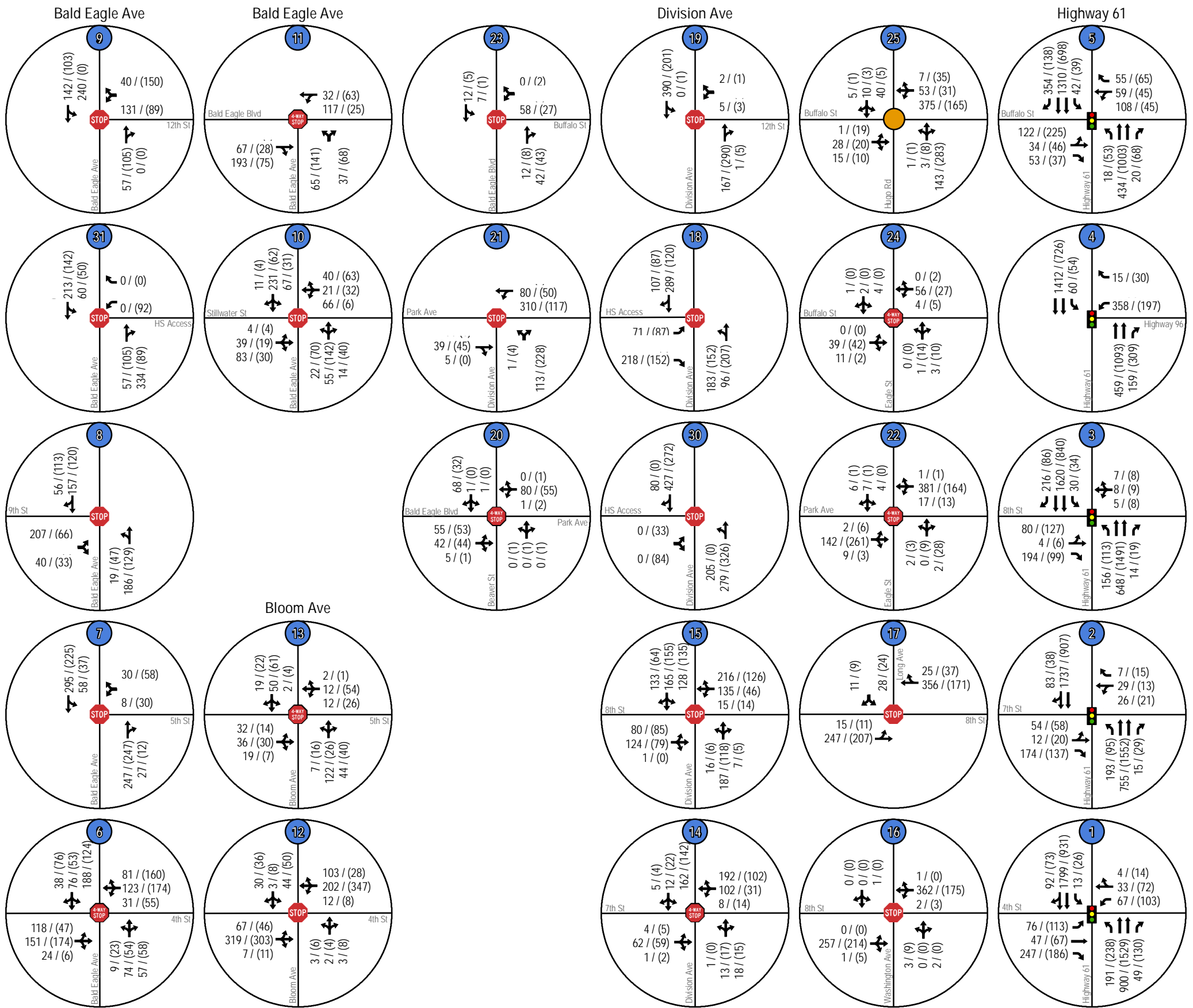


	Existing Traffic Control (Includes Hwy 61/8th St Signal)	Intersection ID	Project: ISDWB 154475 Print Date: 10/9/2020	2024 Traffic Volumes (7:30 HS, 8:00 MS) WBL School Expansion Study White Bear Lake, MN	Figure 9
	Minor Street Stop Control 3-way Stop (WB Free)	Existing Geometrics (Includes Hwy 61/8th St Signal Project)	User Name: jdanibas Projection: NAD 1983 HARN Adj MN Ramsey Feet Source:		
All-way Stop Control	Traffic Signal	XX / (XX) — School Arrival Peak Hour Volume XX / (XX) — School Dismissal Peak Hour Volume			

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

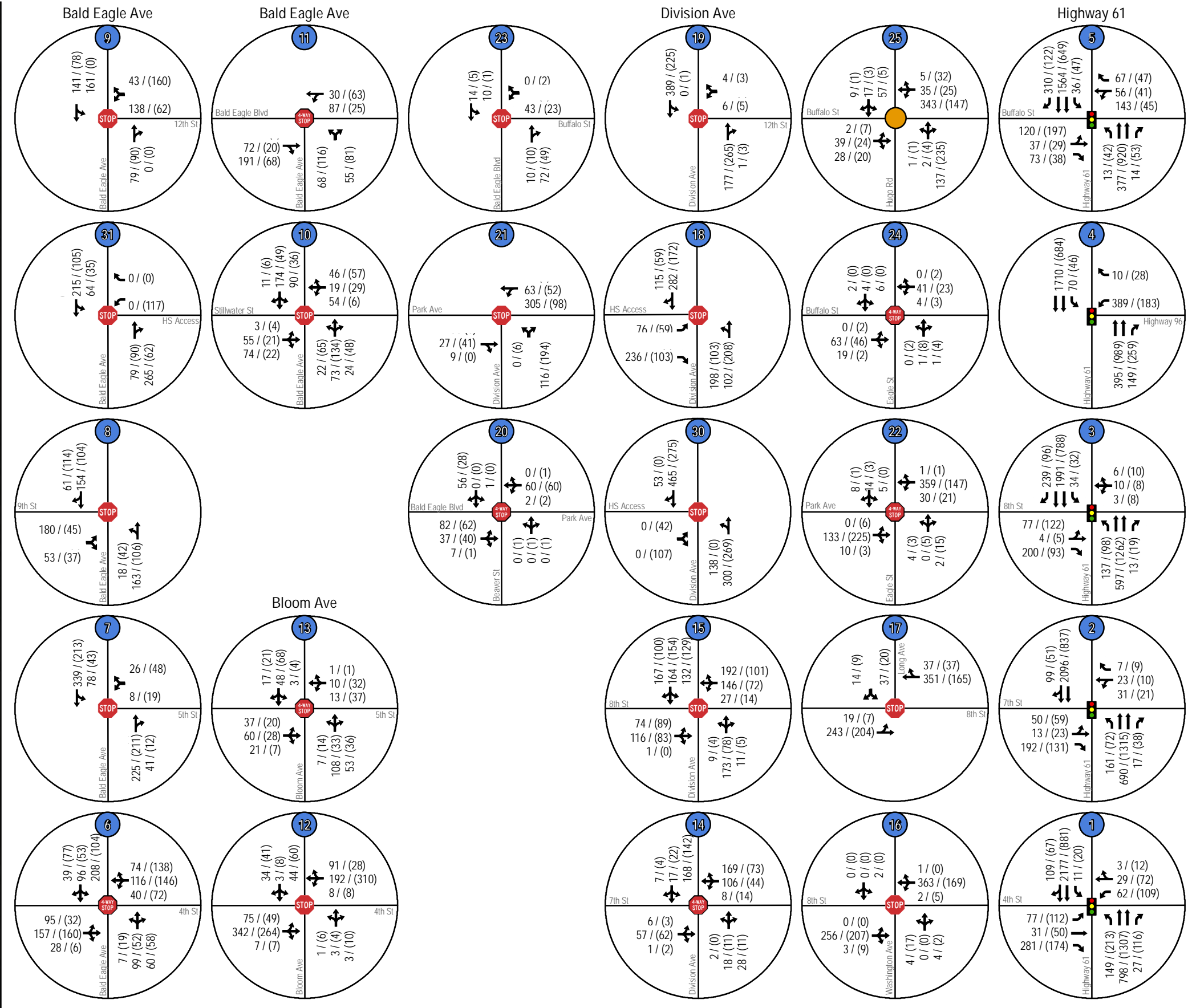


Path: X:\F\MSDWB\154475\5-final-dsgn\51-drawings\90-GIS\Figure 10_2028 Traffic Volumes (830 & 800).mxd



	Existing Traffic Control (Includes Hwy 61/8th St Signal)	6 Intersection ID	Project: ISDWB 154475 Print Date: 10/9/2020	2028 Traffic Volumes (8:30 HS, 8:00 MS) WBL School Expansion Study White Bear Lake, MN	Figure 10
	Minor Street Stop Control 3-way Stop (WB Free) All-way Stop Control Traffic Signal	Existing Geometrics (Includes Hwy 61/8th St Signal Project) XX / (XX) — School Arrival Peak Hour Volume XX / (XX) — School Dismissal Peak Hour Volume	User Name: jdanibas Projection: NAD 1983 HARN Adj MN Ramsey Feet Source:		

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	Existing Traffic Control (Includes Hwy 61/8th St Signal) STOP Minor Street Stop Control 3-way Stop (WB Free) All-way Stop Control Traffic Signal	Intersection ID Existing Geometrics (Includes Hwy 61/8th St Signal Project) School Arrival Peak Hour Volume XX / (XX) — School Dismissal Peak Hour Volume	Project: ISDWB 154475 Print Date: 10/9/2020	2028 Traffic Volumes (7:30 HS, 8:00 MS) WBL School Expansion Study White Bear Lake, MN	Figure 11
			User Name: jdanibas Projection: NAD 1983 HARN Adj MN Ramsey Feet Source:		

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

Scenario 1a: 2024 School Year Conditions (8:30 AM HS, 8:00 AM MS)

Based on the traffic operations analysis, the following mitigations were found to greatly improve traffic operations for the study intersections.

- Optimize the signal timing along Highway 61 to provide sufficient green time for the northbound left turn and eastbound phases to improve school traffic operations while maintaining the acceptable splits for through vehicles on Highway 61 based on MnDOT signal timing guidance.
- Add a leading eastbound protected phase during the school peak hour to improve traffic operations on Buffalo Street and northbound Hugo Road.
- Convert the intersection of Division Avenue at 8th Street to an all-way stop controlled intersection (or mini roundabout; traffic control discussed in the **Division Avenue at 7th Street and 8th Street Traffic Control Considerations** section)
- The cross-section of 8th Street between Highway 61 and Division Avenue will need to be modified in order to provide better traffic operations for two-way traffic. Options for 8th Street are discussed in the **8th Street Design Considerations** section of this memorandum.
- Provide dedicated right and left turn lanes into the school site at the pick up/drop off access on Division Avenue and the main access on Bald Eagle Avenue. Provide a dedicated left turn lane into the school site at the student parking access on Division Avenue

With the optimized signal timings along Highway 61, the following operational concerns still exist along Highway 61.

- With improved signal timing for northbound left turns, the average left turn queues at 4th Street, 7th Street, and 8th Street will be stored within the available storage length. However, occasional peak hour maximum queues will spill beyond the available storage.
- Despite improved signal timing for eastbound Buffalo Street and a leading eastbound protected phase during the school dismissal peak hour, there are delay and queueing issues for northbound vehicles at the intersection of Hugo Road at Buffalo Street. The delay and queueing issues at this intersection are directly related to the amount of eastbound green time on Buffalo Street, as the intersection would operate acceptably if it were not so close to the signalized intersection at Highway 61.

Tables 7 and 8 show the 2024 school year traffic operations during the school arrival and dismissal peak hours with an 8:30 AM high school start time and an 8:00 AM middle school start time. More detailed results are shown in the attached **Tables B1a-1 and B1a-2**.

Table 7 – 2024 School Year Traffic Operations (8:30 HS, 8:00 MS) – School Arrival Peak Hour

Intersection	Control	Approach (Delay/LOS)				Intersection (Delay/LOS)
		NB	SB	EB	WB	
TH 61 at 4th St	Signal	15.2 / B	11.4 / B	36.7 / D	76.0 / E	17.4 / B
TH 61 at 7th St	Signal	17.1 / B	8.7 / A	40.9 / D	51.9 / D	14.6 / B
TH 61 at 8th St	Signal	14.8 / B	15.8 / B	32.6 / C	46.9 / D	17.3 / B
TH 61 at TH 96	Signal	6.8 / A	18.4 / B		85.1 / F	26.1 / C
TH 61 at Buffalo St	Signal	27.4 / C	12.9 / B	69.6 / E	56.8 / E	23.9 / C
Long Ave at 8th St	Thru/Stop		25.7 / D	11.5 / B	0.9 / A	6.7 / A
Washington Ave at 8th St	Thru/Stop	5.7 / A	7.1 / A	2.1 / A	0.8 / A	1.4 / A
Division Ave at 7th St	All-way Stop	4.3 / A	6.8 / A	6.1 / A	8.7 / A	7.5 / A
Division Ave at 8th St	All-way Stop	11.0 / B	8.7 / A	9.8 / A	11.1 / B	10.0 / B
Division Ave at New HS Access	Thru/Stop	3.6 / A	2.0 / A	0.0 / A*		2.8 / A
Division Ave at New HS Pick Up/Drop Off Access	Thru/Stop	0.2 / A	9.9 / A	6.8 / A		6.2 / A
Division Ave at 12th St	Thru/Stop	0.4 / A	0.9 / A		5.3 / A	0.8 / A
Bloom Ave at 4th St	Thru/Stop	7.4 / A	7.7 / A	2.9 / A	2.3 / A	3.3 / A
Bloom Ave at 5th St	Thru/Stop	5.5 / A	5.4 / A	5.0 / A	5.4 / A	5.3 / A
Bald Eagle Ave at 4th St	All-way Stop	6.4 / A	7.2 / A	8.3 / A	8.0 / A	7.6 / A
Bald Eagle Ave at 5th St	Thru/Stop	1.4 / A	1.7 / A		4.7 / A	1.8 / A
Bald Eagle Ave at 9th St	Thru/Stop	0.7 / A	0.7 / A	8.1 / A		3.4 / A
Bald Eagle Ave at New HS Access	Thru/Stop	1.5 / A	3.1 / A		0.0 / A*	2.2 / A
Bald Eagle Ave at 12th St/HS Access	Thru/Stop	0.5 / A	2.8 / A		12.4 / B	5.1 / A
Bald Eagle Ave at Stillwater St	Thru/Stop	0.9 / A	1.4 / A	5.9 / A	6.4 / A	3.2 / A
Bald Eagle Ave at Bald Eagle Blvd	All-way Stop	3.7 / A		5.3 / A	6.6 / A	5.4 / A
Bald Eagle Blvd at Park Ave/Beaver St	All-way Stop	0.0 / A*	3.0 / A	6.3 / A	6.1 / A	5.4 / A
Division Ave at Park Ave	Thru/Stop	3.3 / A		2.3 / A	4.6 / A	4.1 / A
Eagle St at Park Ave	All-way Stop	3.8 / A	5.2 / A	6.2 / A	7.4 / A	7.0 / A
Bald Eagle Blvd at Buffalo St	Thru/Stop	4.1 / A	5.3 / A		6.2 / A	5.1 / A
Eagle St at Buffalo St	All-way Stop	3.6 / A	4.2 / A	5.3 / A	6.0 / A	5.5 / A
Hugo Rd at Buffalo St	3-way Stop	13.8 / B	19.1 / C	29.0 / D	0.8 / A	7.0 / A
*No exiting volume during the arrival peak hour						

Table 8 – 2024 School Year Traffic Operations (8:30 HS, 8:00 MS) – School Dismissal Peak Hour

Intersection	Control	Approach (Delay/LOS)				Intersection (Delay/LOS)
		NB	SB	EB	WB	
TH 61 at 4th St	Signal	19.3 / B	15.9 / B	30.3 / C	54.4 / D	21.5 / C
TH 61 at 7th St	Signal	3.3 / A	3.0 / A	25.8 / C	40.4 / D	5.5 / A
TH 61 at 8th St	Signal	9.9 / A	10.9 / B	27.0 / C	37.4 / D	11.8 / B
TH 61 at TH 96	Signal	6.5 / A	15.0 / B		46.1 / D	13.2 / B
TH 61 at Buffalo St	Signal	29.3 / C	14.1 / B	57.0 / E	32.0 / C	27.5 / C
Long Ave at 8th St	Thru/Stop		13.0 / B	6.6 / A	0.7 / A	4.4 / A
Washington Ave at 8th St	Thru/Stop	5.7 / A	0.0 / A*	1.6 / A	0.6 / A	1.2 / A
Division Ave at 7th St	All-way Stop	4.6 / A	7 / A	6.1 / A	4.7 / A	5.9 / A
Division Ave at 8th St	All-way Stop	6.9 / A	7.3 / A	8.2 / A	6.7 / A	7.3 / A
Division Ave at New HS Access	Thru/Stop	1.7 / A	1.5 / A	6.3 / A		2.4 / A
Division Ave at New HS Pick Up/Drop Off Access	Thru/Stop	0.2 / A	6.4 / A	5.1 / A		3.1 / A
Division Ave at 12th St	Thru/Stop	0.4 / A	0.6 / A		4.1 / A	0.5 / A
Bloom Ave at 4th St	Thru/Stop	7.3 / A	10.3 / B	3.0 / A	2.1 / A	3.5 / A
Bloom Ave at 5th St	Thru/Stop	4.5 / A	5.3 / A	5.5 / A	5.7 / A	5.2 / A
Bald Eagle Ave at 4th St	All-way Stop	5.9 / A	6.2 / A	7.6 / A	10.7 / B	8.2 / A
Bald Eagle Ave at 5th St	Thru/Stop	1.0 / A	1.5 / A		5.9 / A	1.9 / A
Bald Eagle Ave at 9th St	Thru/Stop	1.2 / A	2.2 / A	6.0 / A		2.6 / A
Bald Eagle Ave at New HS Access	Thru/Stop	5.5 / A	6.5 / A		5.1 / A	5.8 / A
Bald Eagle Ave at 12th St/HS Access	Thru/Stop	2.4 / A	0.4 / A		6.0 / A	3.8 / A
Bald Eagle Ave at Stillwater St	Thru/Stop	1.6 / A	1.4 / A	5.1 / A	4.9 / A	2.6 / A
Bald Eagle Ave at Bald Eagle Blvd	All-way Stop	4.4 / A		4.3 / A	6.8 / A	4.9 / A
Bald Eagle Blvd at Park Ave/Beaver St	All-way Stop	2.9 / A	2.6 / A	5.8 / A	5.9 / A	5.3 / A
Division Ave at Park Ave	Thru/Stop	4.7 / A		2.4 / A	3.9 / A	4.1 / A
Eagle St at Park Ave	All-way Stop	3.7 / A	1.7 / A	7.0 / A	6.1 / A	6.3 / A
Bald Eagle Blvd at Buffalo St	Thru/Stop	3.7 / A	5.4 / A		6.0 / A	4.6 / A
Eagle St at Buffalo St	All-way Stop	4.9 / A	0.0 / A*	5.7 / A	5.4 / A	5.4 / A
Hugo Rd at Buffalo St	3-way Stop	66.9 / F	17.7 / C	12.6 / B	0.9 / A	35.2 / E
*No volume during the school dismissal peak hour						

Scenario 1b: 2024 School Year Conditions (7:30 AM HS, 8:00 AM MS)

Based on the traffic operations analysis, the same mitigations as the 8:30 AM high school start time (**Scenario 1a**) were found to greatly improve traffic operations for the study intersections with no additional geometric/traffic control changes needed.

In general, the non-Highway 61 intersections operate similarly with a 7:30 AM or 8:30 AM high school Start time. However, the Highway 61 intersections operate with less delay during the school arrival peak hour with an 8:30 AM high school Start time because the school arrival peak hour has less overlap with the AM peak hour through traffic on Highway 61. With a 7:30 AM high school Start time, the school arrival peak hour is essentially the same as the Highway 61 through traffic peak hour, which results in increased delay and queueing.

During the school dismissal peak hour, the Highway 61 intersection operate with slightly higher delays with an 8:30 AM high school Start time compared to a 7:30 AM high school Start time because the school dismissal peak hour moves closer to the Highway 61 PM peak hour the later the high school starts. However, these increased delays are not significant and in general any traffic operational issues occur during the arrival peak hour, therefore, the high school start time's effect on traffic operations in the arrival peak hour are more important than the effects during the dismissal peak hour.

Tables 9 and 10 show the 2024 school year traffic operations during the school arrival and dismissal peak hours with an 7:30 AM high school start time and an 8:00 AM middle school start time. More detailed results are shown in the attached **Tables B1b-1 and B1b-2**.

Table 9 – 2024 School Year Traffic Operations (7:30 HS, 8:00 MS) – School Arrival Peak Hour

Intersection	Control	Approach (Delay/LOS)				Intersection (Delay/LOS)
		NB	SB	EB	WB	
TH 61 at 4th St	Signal	13.9 / B	23.3 / C	55.8 / E	64.9 / E	25.3 / C
TH 61 at 7th St	Signal	15.6 / B	14.0 / B	55.4 / E	67.7 / E	18.4 / B
TH 61 at 8th St	Signal	16.3 / B	33.4 / C	34.7 / C	34.1 / C	29.6 / C
TH 61 at TH 96	Signal	7.4 / A	22.3 / C		84.7 / F	28.7 / C
TH 61 at Buffalo St	Signal	28.7 / C	14.9 / B	57.0 / E	64.4 / E	25.5 / C
Long Ave at 8th St	Thru/Stop		53.7 / F	20.1 / C	0.8 / A	12.3 / B
Washington Ave at 8th St	Thru/Stop	10 / B	12.1 / B	2.9 / A	1.2 / A	2.1 / A
Division Ave at 7th St	All-way Stop	4.3 / A	6.9 / A	6.1 / A	9.5 / A	7.8 / A
Division Ave at 8th St	All-way Stop	11.8 / B	10.6 / B	9.2 / A	13.9 / B	11.5 / B
Division Ave at New HS Access	Thru/Stop	3.3 / A	1.9 / A	0.0 / A*		2.5 / A
Division Ave at New HS Pick Up/Drop Off Access	Thru/Stop	0.2 / A	10.7 / B	6.7 / A		6.4 / A
Division Ave at 12th St	Thru/Stop	0.5 / A	1.1 / A		5.2 / A	1.0 / A
Bloom Ave at 4th St	Thru/Stop	10.7 / B	49.4 / E	9.9 / A	2.3 / A	11.3 / B
Bloom Ave at 5th St	Thru/Stop	5.5 / A	25.2 / D	5.8 / A	5.2 / A	9.6 / A
Bald Eagle Ave at 4th St	All-way Stop	7.2 / A	8.6 / A	8.8 / A	8.9 / A	8.5 / A
Bald Eagle Ave at 5th St	Thru/Stop	1.7 / A	1.9 / A		6.1 / A	2.1 / A
Bald Eagle Ave at 9th St	Thru/Stop	0.7 / A	0.8 / A	8.8 / A		3.7 / A
Bald Eagle Ave at New HS Access	Thru/Stop	1.5 / A	3.1 / A		0.0 / A*	2.2 / A
Bald Eagle Ave at 12th St/HS Access	Thru/Stop	0.5 / A	2.5 / A		9.1 / A	4.2 / A
Bald Eagle Ave at Stillwater St	Thru/Stop	0.9 / A	1.6 / A	6.8 / A	5.8 / A	3.3 / A
Bald Eagle Ave at Bald Eagle Blvd	All-way Stop	3.6 / A		5.1 / A	6.4 / A	5.0 / A
Bald Eagle Blvd at Park Ave/Beaver St	All-way Stop	0.0 / A*	3.0 / A	6.0 / A	6.1 / A	5.3 / A
Division Ave at Park Ave	Thru/Stop	3.4 / A		2.3 / A	4.6 / A	4.2 / A
Eagle St at Park Ave	All-way Stop	3.5 / A	5.7 / A	6.3 / A	7.5 / A	7.0 / A
Bald Eagle Blvd at Buffalo St	Thru/Stop	3.7 / A	5.1 / A		6.0 / A	4.6 / A
Eagle St at Buffalo St	All-way Stop	2.9 / A	4.1 / A	4.9 / A	5.6 / A	5.0 / A
Hugo Rd at Buffalo St	3-way Stop	4.6 / A	26.4 / D	24.6 / C	1.0 / A	7.6 / A
*No exiting volume during the arrival peak hour						

Table 10 – 2024 School Year Traffic Operations (7:30 HS, 8:00 MS) – School Dismissal Peak Hour

Intersection	Control	Approach (Delay/LOS)				Intersection (Delay/LOS)
		NB	SB	EB	WB	
TH 61 at 4th St	Signal	18.2 / B	15.5 / B	29.6 / C	51.7 / D	21.0 / C
TH 61 at 7th St	Signal	2.8 / A	2.5 / A	28.2 / C	40.3 / D	5.2 / A
TH 61 at 8th St	Signal	8.7 / A	8.8 / A	26.4 / C	34.3 / C	10.5 / B
TH 61 at TH 96	Signal	5.3 / A	12.9 / B		46.0 / D	11.7 / B
TH 61 at Buffalo St	Signal	24.8 / C	11.8 / B	51.4 / D	32.4 / C	23.6 / C
Long Ave at 8th St	Thru/Stop		13.8 / B	7.3 / A	0.7 / A	4.8 / A
Washington Ave at 8th St	Thru/Stop	5.8 / A	0.0 / A*	1.6 / A	0.7 / A	1.4 / A
Division Ave at 7th St	All-way Stop	4.1 / A	6.9 / A	6.0 / A	4.8 / A	5.8 / A
Division Ave at 8th St	All-way Stop	6.3 / A	7.3 / A	7.6 / A	6.2 / A	7.0 / A
Division Ave at New HS Access	Thru/Stop	1.5 / A	1.9 / A	7.4 / A		2.8 / A
Division Ave at New HS Pick Up/Drop Off Access	Thru/Stop	0.2 / A	7.0 / A	4.9 / A		3.5 / A
Division Ave at 12th St	Thru/Stop	0.4 / A	0.5 / A		4.4 / A	0.5 / A
Bloom Ave at 4th St	Thru/Stop	8.9 / A	10.3 / B	3.1 / A	2.1 / A	3.8 / A
Bloom Ave at 5th St	Thru/Stop	4.7 / A	5.7 / A	4.8 / A	5.5 / A	5.2 / A
Bald Eagle Ave at 4th St	All-way Stop	5.6 / A	5.8 / A	7.5 / A	10.7 / B	8.1 / A
Bald Eagle Ave at 5th St	Thru/Stop	1.1 / A	1.6 / A		5.5 / A	1.9 / A
Bald Eagle Ave at 9th St	Thru/Stop	1.4 / A	2.1 / A	4.7 / A		2.3 / A
Bald Eagle Ave at New HS Access	Thru/Stop	5.3 / A	6.4 / A		5.4 / A	5.7 / A
Bald Eagle Ave at 12th St/HS Access	Thru/Stop	2.5 / A	0.4 / A		5.6 / A	3.7 / A
Bald Eagle Ave at Stillwater St	Thru/Stop	1.7 / A	1.5 / A	5.2 / A	5.0 / A	2.7 / A
Bald Eagle Ave at Bald Eagle Blvd	All-way Stop	4.2 / A		3.9 / A	6.9 / A	4.8 / A
Bald Eagle Blvd at Park Ave/Beaver St	All-way Stop	4.8 / A	2.6 / A	5.5 / A	5.6 / A	5.1 / A
Division Ave at Park Ave	Thru/Stop	4.1 / A		2.4 / A	3.7 / A	3.8 / A
Eagle St at Park Ave	All-way Stop	3.9 / A	2.5 / A	6.6 / A	5.9 / A	6.1 / A
Bald Eagle Blvd at Buffalo St	Thru/Stop	3.8 / A	5.0 / A		5.7 / A	4.3 / A
Eagle St at Buffalo St	All-way Stop	5.5 / A	0.0 / A*	5.6 / A	5.2 / A	5.5 / A
Hugo Rd at Buffalo St	3-way Stop	11.2 / B	11.2 / B	12.9 / B	0.9 / A	7.4 / A
*No volume during the school dismissal peak hour						

Scenario 2a: 2028 School Year Conditions (8:30 AM HS, 8:00 AM MS)

Based on the traffic operations analysis, the same mitigations as the 2024 School Year Conditions (**Scenarios 1a and 1b**) were found to greatly improve traffic operations for the study intersections with no additional geometric/traffic control changes needed. Those mitigations are repeated below:

- Optimize the signal timing along Highway 61 to provide sufficient green time for the northbound left turn and eastbound phases to improve school traffic operations while maintaining the acceptable splits for through vehicles on Highway 61 based on MnDOT signal timing guidance.
- Add a leading eastbound protected phase during the school peak hour to improve traffic operations on Buffalo Street and northbound Hugo Road.
- Convert the intersection of Division Avenue at 8th Street to an all-way stop controlled intersection (or mini roundabout; traffic control discussed in the **Division Avenue at 7th Street and 8th Street Traffic Control Considerations** section)
- The cross-section of 8th Street between Highway 61 and Division Avenue will need to be modified in order to provide better traffic operations for two-way traffic. Options for 8th Street are discussed in the **8th Street Design Considerations** section of this memorandum.
- Provide dedicated right and left turn lanes into the school site at the pick up/drop off access on Division Avenue and the main access on Bald Eagle Avenue. Provide a dedicated left turn lane into the school site at the student parking access on Division Avenue

As was found in the 2024 analysis, despite optimized signal timings along Highway 61, the following operational concerns still exist along Highway 61.

- With improved signal timing for northbound left turns, the average left turn queues at 4th Street, 7th Street, and 8th Street will be stored within the available storage length. However, occasional peak hour maximum queues will spill beyond the available storage.
- Despite improved signal timing for eastbound Buffalo Street and a leading eastbound protected phase during the school dismissal peak hour, there are delay and queueing issues for northbound vehicles at the intersection of Hugo Road at Buffalo Street. The delay and queueing issues at this intersection are directly related to the amount of eastbound green time on Buffalo Street, as the intersection would operate acceptably if it were not so close to the signalized intersection at Highway 61.

Tables 11 and 12 show the 2028 school year traffic operations during the school arrival and dismissal peak hours with an 8:30 AM high school start time and an 8:00 AM middle school start time. Mote detailed results are shown in the attached **Tables B2a-1 and B2a-2**.

Table 12 – 2028 School Year Traffic Operations (8:30 HS, 8:00 MS) – School Dismissal Peak Hour

Intersection	Control	Approach (Delay/LOS)				Intersection (Delay/LOS)
		NB	SB	EB	WB	
TH 61 at 4th St	Signal	20.5 / C	16.5 / B	29.2 / C	55.6 / E	22.1 / C
TH 61 at 7th St	Signal	4.5 / A	3.3 / A	26.6 / C	41.0 / D	6.4 / A
TH 61 at 8th St	Signal	11.0 / B	11.4 / B	26.0 / C	36.7 / D	12.6 / B
TH 61 at TH 96	Signal	6.4 / A	15.5 / B		46.5 / D	13.0 / B
TH 61 at Buffalo St	Signal	30.8 / C	14.8 / B	59.8 / E	33.3 / C	28.4 / C
Long Ave at 8th St	Thru/Stop		12.7 / B	7.0 / A	0.8 / A	4.6 / A
Washington Ave at 8th St	Thru/Stop	6.2 / A	0.0* / A	1.6 / A	0.7 / A	1.3 / A
Division Ave at 7th St	All-way Stop	4.4 / A	7.0 / A	5.9 / A	5.0 / A	5.9 / A
Division Ave at 8th St	All-way Stop	7.3 / A	8.9 / A	8.1 / A	6.7 / A	8.0 / A
Division Ave at New HS Access	Thru/Stop	1.7 / A	1.4 / A	7.7 / A		2.5 / A
Division Ave at New HS Pick Up/Drop Off Access	Thru/Stop	0.2 / A	6.8 / A	5.9 / A		3.7 / A
Division Ave at 12th St	Thru/Stop	0.5 / A	0.7 / A		5.5 / A	0.6 / A
Bloom Ave at 4th St	Thru/Stop	6.8 / A	10.8 / B	3.0 / A	2.2 / A	3.6 / A
Bloom Ave at 5th St	Thru/Stop	4.6 / A	5.4 / A	5.3 / A	5.8 / A	5.3 / A
Bald Eagle Ave at 4th St	All-way Stop	6.5 / A	7.0 / A	8.1 / A	11.6 / B	8.9 / A
Bald Eagle Ave at 5th St	Thru/Stop	1.2 / A	1.5 / A		6.7 / A	2.2 / A
Bald Eagle Ave at 9th St	Thru/Stop	1.5 / A	2.4 / A	5.7 / A		2.7 / A
Bald Eagle Ave at New HS Access	Thru/Stop	5.5 / A	6.7 / A		5.5 / A	6.0 / A
Bald Eagle Ave at 12th St/HS Access	Thru/Stop	2.5 / A	0.4 / A		6.7 / A	4.4 / A
Bald Eagle Ave at Stillwater St	Thru/Stop	1.8 / A	1.4 / A	5.1 / A	5.2 / A	2.8 / A
Bald Eagle Ave at Bald Eagle Blvd	All-way Stop	4.7 / A		4.1 / A	7.1 / A	5.1 / A
Bald Eagle Blvd at Park Ave/Beaver St	All-way Stop	4.5 / A	2.6 / A	5.7 / A	6.1 / A	5.3 / A
Division Ave at Park Ave	Thru/Stop	4.9 / A		2.6 / A	3.9 / A	4.3 / A
Eagle St at Park Ave	All-way Stop	4.1 / A	1.3 / A	7.2 / A	6.3 / A	6.5 / A
Bald Eagle Blvd at Buffalo St	Thru/Stop	3.6 / A	5.7 / A		5.7 / A	4.4 / A
Eagle St at Buffalo St	All-way Stop	5.3 / A	0.0 / A*	5.7 / A	5.6 / A	5.6 / A
Hugo Rd at Buffalo St	3-way Stop	156.1 / F	12.7 / B	17.7 / C	0.9 / A	73.3 / F
*No volume during the school dismissal peak hour						

Scenario 2b: 2028 School Year Conditions (7:30 AM HS, 8:00 AM MS)

Based on the traffic operations analysis, the same mitigations as the 8:30 AM high school start time (**Scenario 2a**) were found to greatly improve traffic operations for the study intersections with no additional geometric/traffic control changes needed.

As was seen in the 2024 school year traffic operations, the non-Highway 61 intersections operate similarly with a 7:30 AM or 8:30 AM high school Start time. However, the Highway 61 intersections operate with less delay during the school arrival peak hour with an 8:30 AM high school Start time because the school arrival peak hour has less overlap with the AM peak hour through traffic on Highway 61. With a 7:30 AM high school Start time, the school arrival peak hour is essentially the same as the Highway 61 through traffic peak hour, which results in increased delay and queueing. These delay and queueing increases are greater in the 2028 school year traffic operations than they were in the 2024 school year traffic operations

During the school dismissal peak hour, the Highway 61 intersections operate with slightly higher delays with an 8:30 AM high school Start time compared to a 7:30 AM high school Start time because the school dismissal peak hour moves closer to the Highway 61 PM peak hour the later the high school starts. As was seen in the 2024 school year traffic operations, these increased delays are not significant and in general any traffic operational issues occur during the arrival peak hour, therefore, the high school start time's effect on traffic operations in the arrival peak hour are more important than the effects during the dismissal peak hour.

Tables 13 and 14 show the 2024 school year traffic operations during the school arrival and dismissal peak hours with an 7:30 AM high school start time and an 8:00 AM middle school start time. More detailed results are shown in the attached **Tables B2b-1 and B2b-2**.

DIVISION AVENUE AT 7TH STREET AND 8TH STREET TRAFFIC CONTROL CONSIDERATIONS

The current all-way stop control at the intersection of Division Avenue at 7th Street is expected to operate acceptably under 2028 full build out conditions; however, the existing minor street stop control at the intersection of Division Avenue at 8th Street is expected to have delay and queueing issues and will require a traffic control change. The primary traffic alternatives for the Division Avenue at 8th Street are all-way stop control and mini roundabout control. For continuity along Division Avenue, the 7th and 8th Street intersection should have the same traffic control.

Under all-way stop control, the intersection of Division Avenue at 8th Street will operate acceptably with and without a westbound right turn lane. However, a westbound right turn lane on 8th Street will improve operations at the intersection of Division Avenue at 8th Street as well as help serve the 200+ westbound right turning vehicles expected during the arrival peak hour.

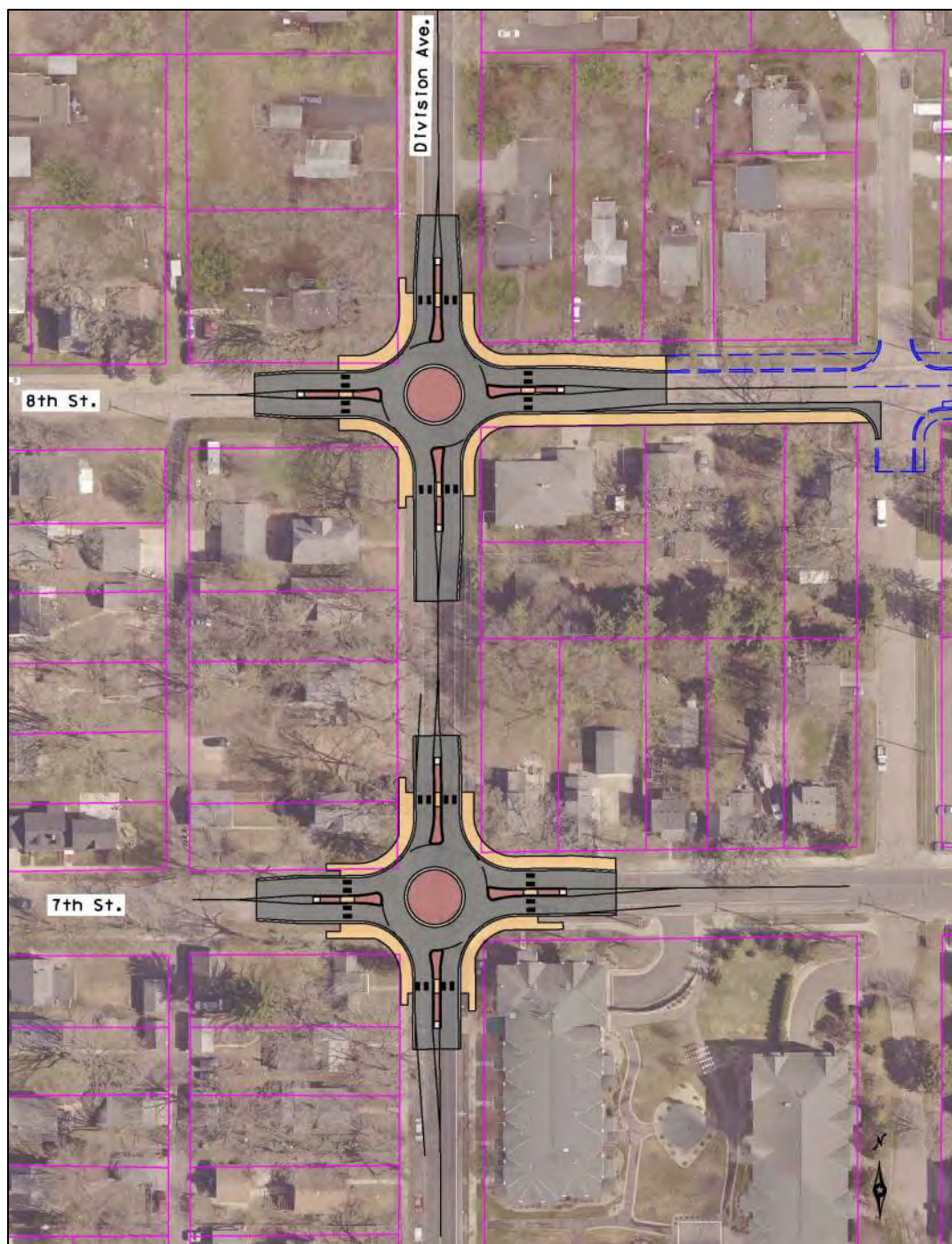
Under mini roundabout control, the intersections of Division Avenue at 7th Street and 8th Street will operate acceptably with minimal delay and queueing. **Figure 12** shows a preliminary concept drawing of both intersection with mini roundabouts. As seen in **Figure 12**, The mini roundabouts will likely have right of way impacts at both intersections. These right of way impacts can likely be minimized with further design adjustments but cannot be eliminated, which makes mini roundabouts an unlikely traffic control alternative at these intersections despite good operational performance.

Table 15 shows the traffic operations analysis results for the intersections of Division Avenue at 8th Street under all-way stop control (with and without a westbound right turn lane on 8th Street) and mini roundabout control under 2028 Full Build Out conditions with an 8:30 AM High School start time an 8:00 AM Middle School start time. The roundabout analysis was completed using the RODEL roundabout analysis software. **Figures 13 and 14** compare the maximum queues during the school arrival and dismissal peak hour for each of the three traffic control/geometry alternatives.

Table 15 – Division Ave at 7th St and 8th St Traffic Operations – Traffic Control Alternatives

Peak Hour	Division Avenue at:	Approach	All-way Stop Control		All-way Stop Control (WBR turn lane at 8 th St)		Mini Roundabout	
			Approach (Delay/LOS)	Intersection (Delay/LOS)	Approach (Delay/LOS)	Intersection (Delay/LOS)	Approach (Delay/LOS)	Intersection (Delay/LOS)
Arrival	7 th Street	NB	4.4 / A	8.2 / A	4.4 / A	8.7 / A	4.2 / A	4.9 / A
		SB	7.0 / A		6.9 / A		4.7 / A	
		EB	6.2 / A		6.3 / A		4.3 / A	
		WB	9.9 / A		10.8 / B		5.1 / A	
	8 th Street	NB	14.2 / B	13.3 / B	16.2 / C	11.8 / B	6.3 / A	7.0 / A
		SB	12.1 / B		11 / B		7.3 / A	
		EB	10.5 / B		10.4 / B		6.1 / A	
		WB	15.8 / C		11 / B		7.6 / A	
Dismissal	7 th Street	NB	4.4 / A	5.9 / A	4.6 / A	5.9 / A	4.3 / A	4.4 / A
		SB	7.0 / A		6.9 / A		4.6 / A	
		EB	5.9 / A		6.3 / A		4.4 / A	
		WB	5.0 / A		4.9 / A		4.3 / A	
	8 th Street	NB	7.3 / A	8.0 / A	7.4 / A	7.8 / A	5.5 / A	6.5 / A
		SB	8.9 / A		8.6 / A		7.3 / A	
		EB	8.1 / A		8.3 / A		7.1 / A	
		WB	6.7 / A		6.2 / A		5.3 / A	

Figure 12 – Mini Roundabout Preliminary Concept



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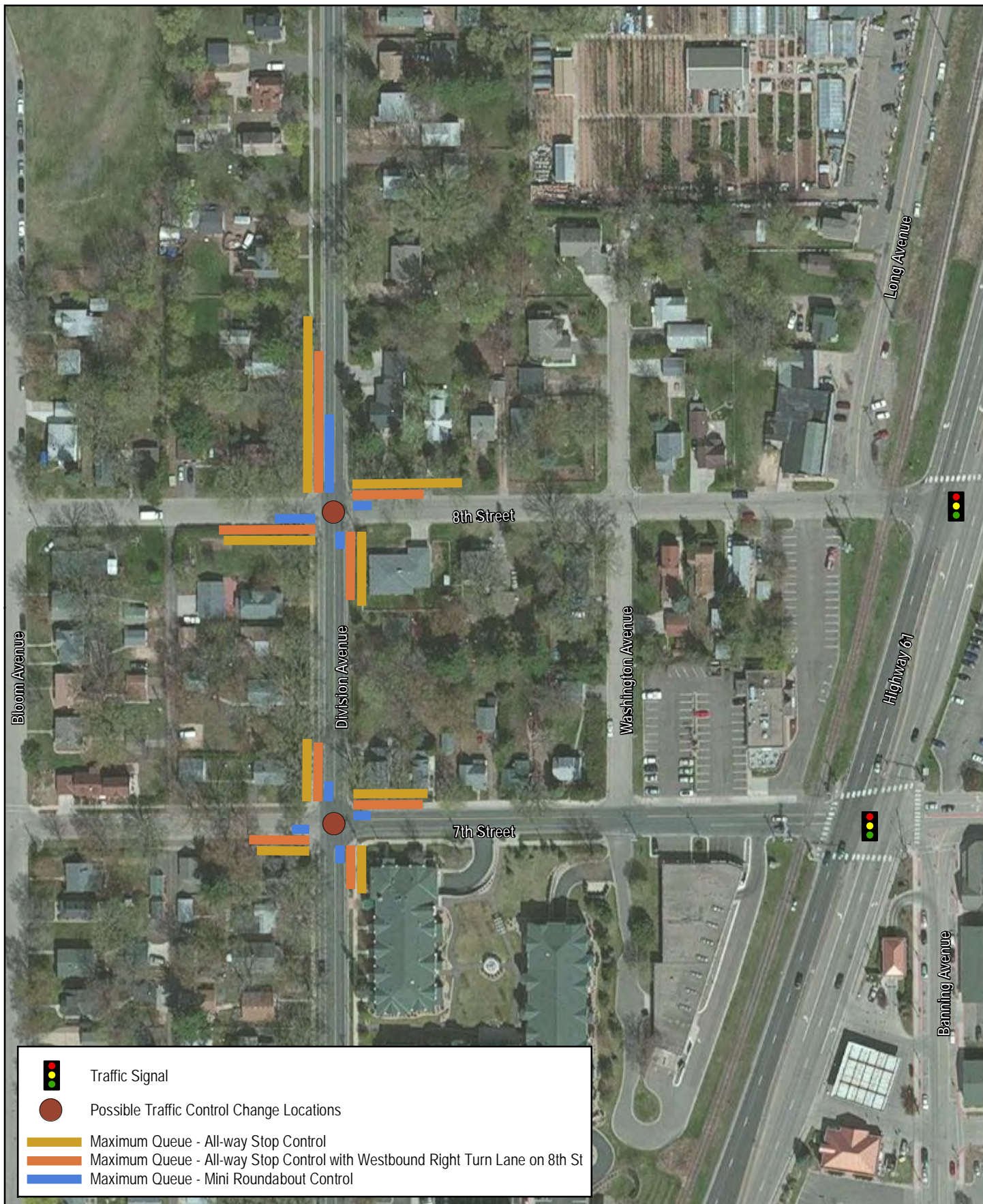
Project: ISDWB 154475
Print Date: 11/24/2020






Map by: jdanibas
Projection: Ramsey Co. Coords.
Source: ESRI Online

**Arrival Peak Hour Maximum Queues
(Traffic Control Alternatives)**
WBL School Expansion Study
White Bear Lake, MN

**Figure
13**

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



	Traffic Signal
	Possible Traffic Control Change Locations
	Maximum Queue - All-way Stop Control
	Maximum Queue - All-way Stop Control with Westbound Right Turn Lane on 8th St
	Maximum Queue - Mini Roundabout Control

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8TH STREET DESIGN CONSIDERATIONS

Currently, 8th Street between Highway 61 and Division Avenue is a 28-foot wide roadway with on-street parking allowed on both sides of the roadway. Under current conditions with vehicles parked on both sides of 8th Street, it can be difficult for two-way traffic to drive along 8th Street. With the school expansion, 8th Street will see a significant increase in traffic in both directions during the school arrival and dismissal periods. Therefore, it is important to allow two-way traffic to efficiently travel along 8th Street. This could be done with the current cross section by removing all on-street parking. This alternative is likely not desirable as many of the residents along 8th Street rely on on-street parking.

8th Street from Washington Avenue to Highway 61 is planned to be reconstructed as part of the BRT project. This section of 8th Street will have one travel lane in each direction and will have an eastbound right turn lane at Highway 61, this reconstruction will likely remove parking along 8th Street between Washington Avenue and Highway 61.

Three design alternatives were considered for 8th Street with varying levels of reconstruction needed. Each alternative considered including the following along 8th Street between Washington Avenue and Division Avenue:

Required

- One eastbound travel lane
- One westbound travel lane
- A sidewalk on either the north or south side of the roadway. The side of the roadway will be analyzed as part of the alternative's analysis phase of the White Bear Lake High School Expansion Study. It should be noted that all the alternatives presented in this memorandum show the sidewalk on the south side of 8th Street.

Considered

- On-street parking on the same side of 8th Street as the sidewalk to provide a buffer between the sidewalk and travel lanes. All the alternatives presented in this memorandum show the parking lane on the south side of 8th Street.
- A westbound right turn lane at Division Avenue

Alternative 1 – Remove Parking – Add Sidewalk

The first alternative (shown in **Figure 15**) involves banning parking on both sides of 8th Street and constructing a sidewalk on 8th Street. This would minimize the amount of reconstruction needed as it would only include construction on one side of 8th Street. However, this alternative would not allow any parking on 8th Street. The typical cross section of the roadway would be:

- 11-ft westbound travel lane
- 11-ft eastbound travel lane
- 6-ft sidewalk
- 28-ft total width (No change from existing)

Alternative 2 – Retain On-Street Parking on one side of Roadway – Add Sidewalk

This alternative (shown in **Figure 16**) would involve expanding 8th Street in order to allow on-street parking on one side of 8th street. The on-street parking should be on the same side of the sidewalk to provide a natural buffer space between pedestrians/bicycles on the sidewalk and the travel lanes. This alternative would require both curb lines on 8th Street to be moved and reconstructed. The typical cross section of the roadway would be:

- 11-ft westbound travel lane
- 11-ft eastbound travel lane
- 8-ft parking lane
- 6-ft sidewalk
- 36-ft total width (8-ft change from existing, all to the south)

Alternative 3 – Right Turn Lane at Division – Retain On-Street Parking on one side of Roadway – Add Sidewalk

This alternative (shown in **Figure 17**) is the same as Alternative 2, except it includes a westbound right turn lane at Division Street. This alternative would not be necessary if the intersection of Division Avenue at 8th Street were to be converted to a mini roundabout. This alternative would provide a right turn lane, one travel lane in each direction, on-street parking, and a sidewalk, which represents the best operating conditions for 8th Street. However, this alternative would have the largest cross section and would require the most reconstruction. The typical cross section of the roadway would be:

- 12-ft westbound right turn lane
- 11-ft westbound travel lane
- 11-ft eastbound travel lane
- 8-ft parking lane
- 6-ft sidewalk
- 48-ft total width (20-ft change from existing, 8-ft change to the south)

Figure 15 – 8th Street Alternative 1 – Remove Parking – Add Sidewalk

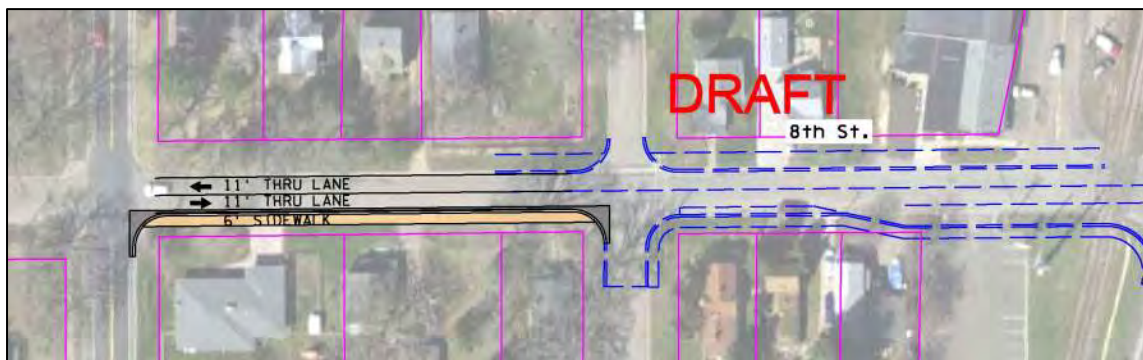


Figure 16 – 8th Street Alternative 2 – Retain On-Street Parking on South Side - Add Sidewalk

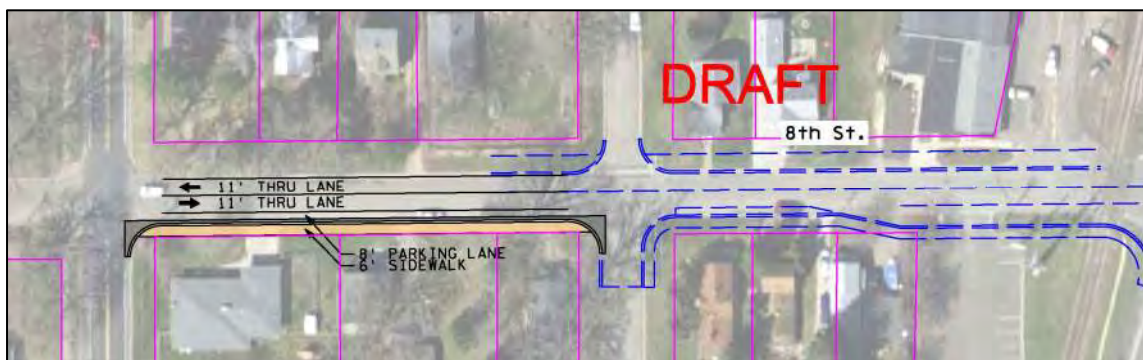
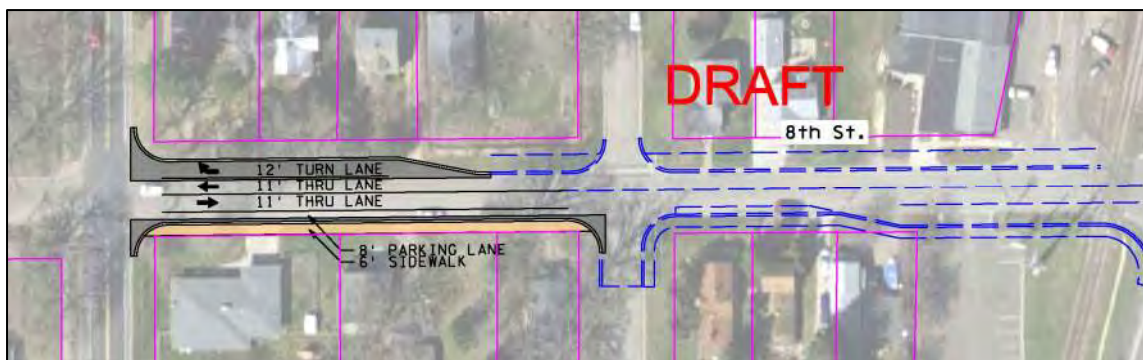


Figure 17 – 8th Street Alternative 3 – Right Turn Lane at Division – Retain On-Street Parking on South Side – Add Sidewalk



PEDESTRIAN CONSIDERATIONS

Currently, the sidewalks in the White Bear Lake Area High School – North Campus and Central Middle School area provide connections for pedestrians to the east, west, and south. However, there are several key locations where pedestrian and bicycle connectivity is missing in the school area, especially to the north. Providing good pedestrian and bicycle connectivity provides a safe route for pedestrians/bicyclists to get to/from the school site as well as encourages more pedestrian/bicycle traffic, which reduces the number of vehicles entering/exiting the site during school arrival and dismissal.

Pedestrian/bicycle facilities are recommended at the following locations to improve pedestrian/bicycle connectivity and safety. **Figure 18** shows the existing and recommended sidewalk/trail locations.

- Add sidewalk/trail on the south side of 8th Street between Highway 61 and Bloom Avenue
- Add sidewalk/trail on the east side of Bald Eagle Avenue from 12th street to Bald Eagle Boulevard
- Add sidewalk/trail on the west side of Division Avenue/Street from 12th Street to Park Avenue
- A marked, mid-block crossing should be added to connect the sidewalk on the west side of Division Avenue to the planned White Bear Lake Art Center parking lot on the east side of the Division Avenue. This crossing should occur south of the school area where Division Avenue is a 2-lane roadway to reduce the pedestrian crossing distance and should have crosswalk warning and advance warning signs.
- Crosswalks should be marked at all stop-controlled roadway and access driveway crossings along Division Avenue and Bald Eagle Avenue to increase the visibility of the pedestrian crossing and improve pedestrian safety.
- Any uncontrolled marked crosswalks along Division Avenue and Bald Eagle Avenue should have crosswalk warning and advance warning signs to improve pedestrian safety.
- Any uncontrolled crossings north of the school on Division Avenue or Bald Eagle Avenue should be further investigated with a sidewalk feasibility study.

There are no marked on-street bicycle lanes within the project area, so many bicyclists will likely use either the shoulder of the study roadways or the available sidewalks/trails. Adequate shoulder areas should be provided to accommodate bike use.

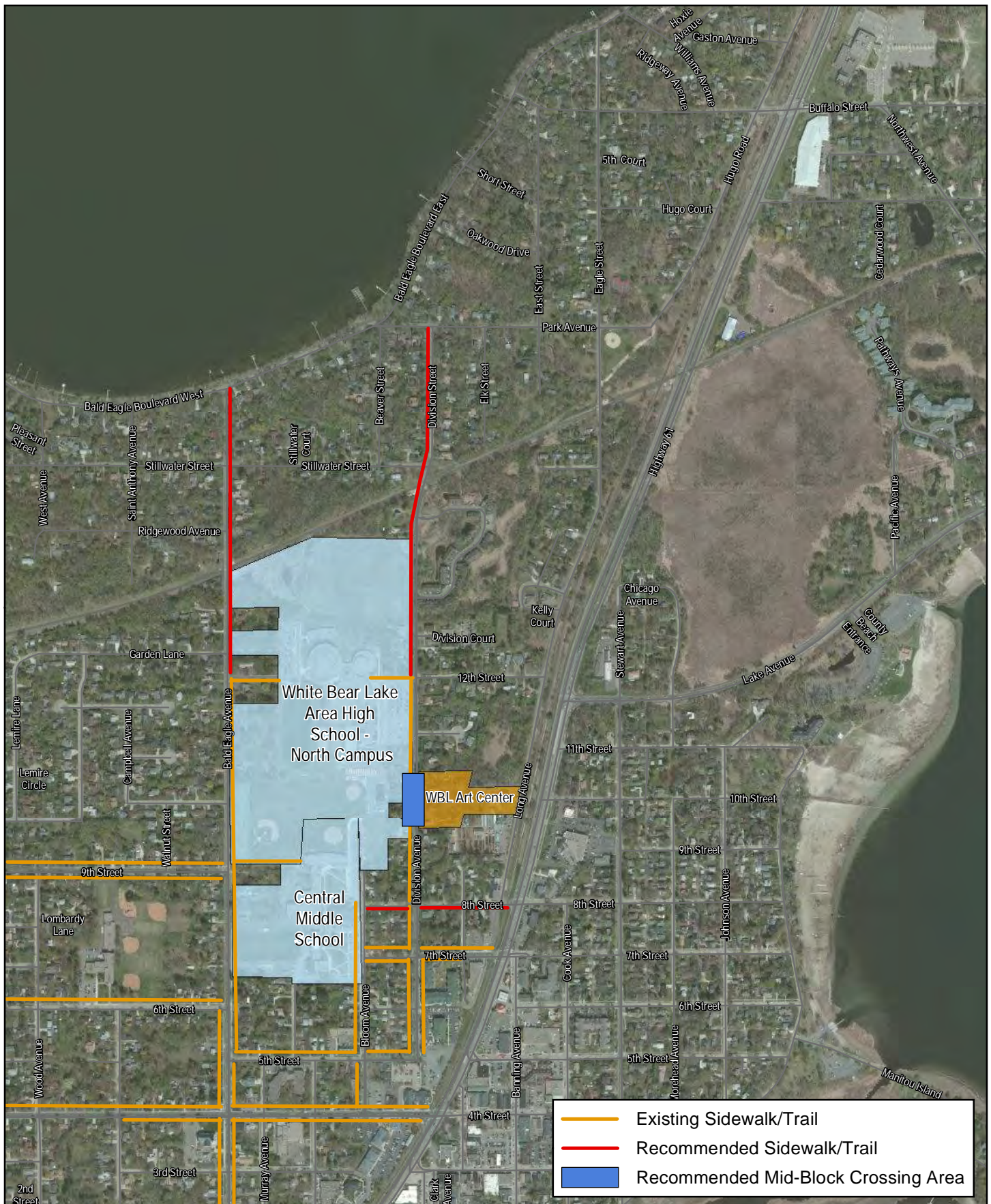
SITE ACCESS SPACING

The current school site plan includes accesses along Division Avenue, Bald Eagle Avenue, and Bloom Avenue, which were designed based on the City of White Bear Lake's policy of a minimum of 100 feet between access locations.

Division Avenue is owned by the City through the project area. The current site plan provides approximately 150 feet between the southern and middle accesses and approximately 800 feet between the middle and northern access points. Therefore, all three accesses along Division Avenue meet the City's access spacing policy.

Bald Eagle Avenue is owned by Ramsey County through this area. The County recommends at least 450 feet of spacing between access points, which is met by the southern and middle access points that are approximately 575 feet apart. However, the middle and northern access points on Bald Eagle Avenue are only approximately 155 feet apart, which meets the City's policy but not the County's recommendation.

Path: X:\F\UNSD\WBV154475\Final\design\1-drawings\90-GIS\Figure 18_Ped-Bike Connectivity_JDA.mxd



Project: ISDWB 154475
Print Date: 1/4/2021

Map by: jdanibas
Projection: Ramsey Co. Coords.
Source: ESRI Online

Pedestrian and Bicycle Connectivity

WBL School Expansion Study

White Bear Lake, MN

Figure
18

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PICK UP/DROP OFF DESIGN CONSIDERATIONS

The current White Bear Lake Area High School site plan included student pick up and drop off areas off of both Division Avenue and Bald Eagle Avenue, shown in **Figure 19**. It is anticipated that a majority of pick up/drop off activity will occur on the east side of the building on Division Avenue.

The middle school pick up/drop area will also be modified to include the current bus pick up/drop off area, shown in **Figure 20**. The buses for the Middle and High School will both use the new bus pick up/drop off area between the Middle and High Schools.

The Texas Transportation Institute's *Operations and Safety Around Schools: Overview of Project Activities and Findings* report provides guidance for school site design and pick up/drop off operations. The study analyzed operations at more than 180 schools in Texas to determine requirements for a safe and efficient school site plan. The guidance in this report has been used in the design of many other schools throughout Minnesota. **Table 16** shows some of the guidelines and best practices outlined the *Operations and Safety Around Schools: Overview of Project Activities and Findings* report and notes how the White Bear Lake Area High School site plan compares.

Table 16 – School Site Design Guidance

Guidance ¹	Included in Current Site Plan (Figure 2)	Notes/Comments:
The basic components of the school site (buses, cars, pedestrians, pick up/drop off, etc.) should be separated where possible	Yes	Current plan separates buses, student parking, and pick up/drop off areas.
Parent drop off/pick up zones should be one-way counterclockwise where students are loaded and unloaded directly to the curb/sidewalk	Yes	Current plan provides two counterclockwise one-way loading areas (one on each side of the building).
Maximize fronting curb space as loading zone	Yes	
Do not load or unload students where they have to cross a vehicular path before entering the building	Yes	Both pick up/drop off areas provide direct access to the school
Schools with over 2,500 students should consider two separate pick up/drop off areas	Yes	Current plan includes two dedicated pick up/drop off areas.
Schools with 800-2,500 students require a stacking length of 1,200-1,500 feet for the parent pick up/drop off area	East Side – 1,397 ft	The east side is expected to serve approximately 70% of pick up/drop off activity (equivalent of 2,434 students served, approx. 380 pick-up/drop off trips), so the 1,397 feet falls within the criteria. The west side will have less pick up/drop off activity (approx. 162 trips) and is expected to have adequate storage to avoid spilling onto Bald Eagle Avenue
¹ Texas Transportation Institute's <i>Operations and Safety Around Schools: Overview of Project Activities and Findings</i> report - https://static.tti.tamu.edu/tti.tamu.edu/documents/0-4286-3.pdf		

Figure 19 – On-Site Pick Up/Drop Off Vehicle Routing – High School

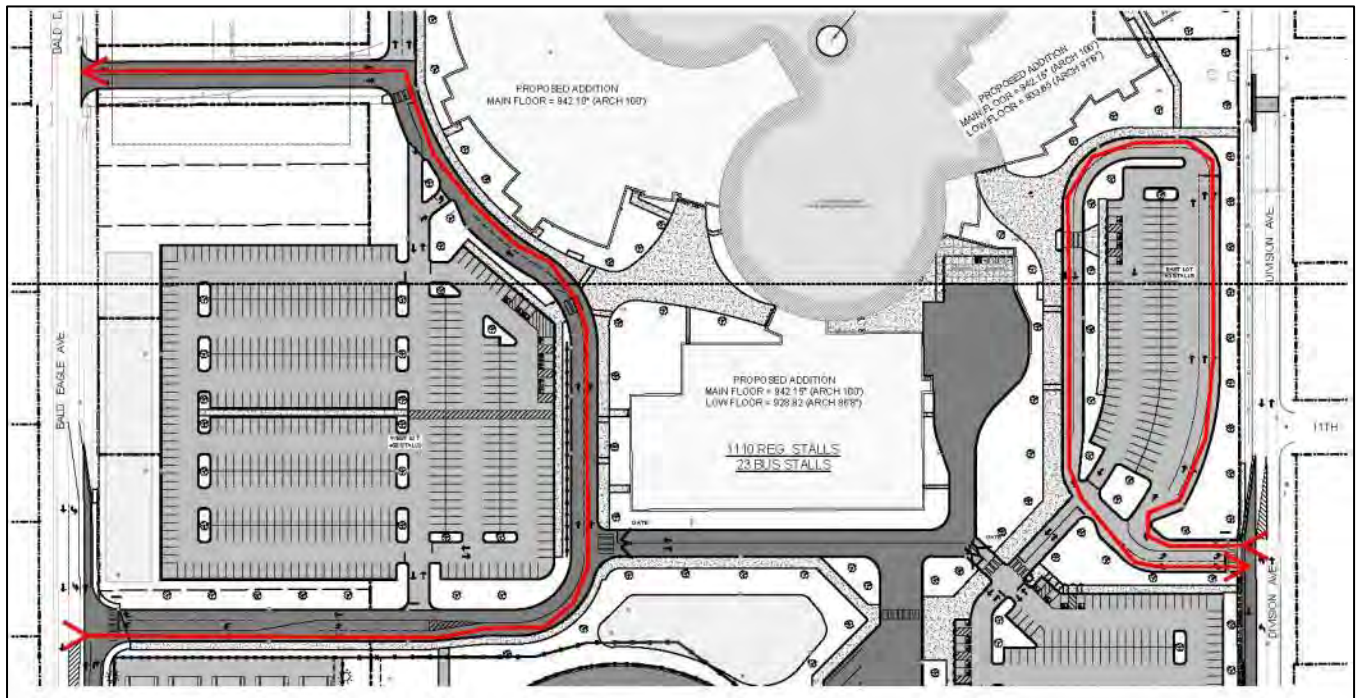
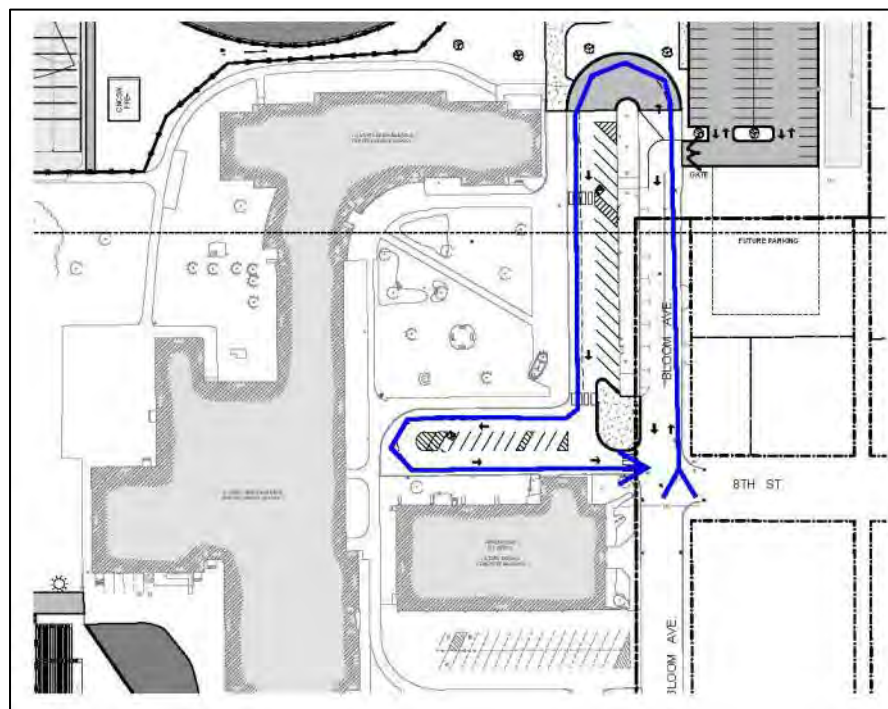


Figure 20 – On-Site Pick Up/Drop Off Vehicle Routing – Middle School

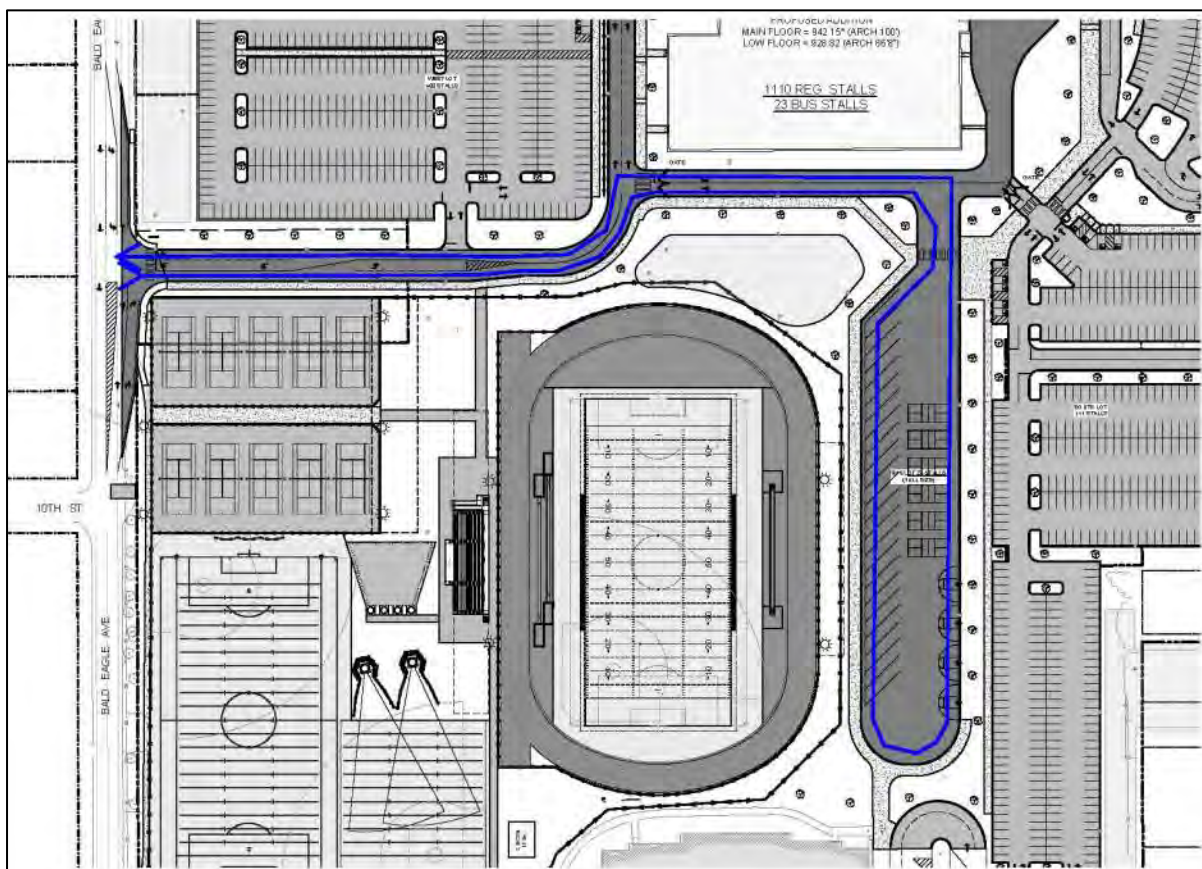


SCHOOL BUS OPERATIONS CONSIDERATIONS

Currently, some of the school buses enter the school area by making a northbound left turn off of Highway 61. As required by law, the buses stop for the railroad crossing. Because of the location of the crossing, the buses stop in the intersection. When multiple buses all make turns off of Highway 61 at the same intersection, all of the buses being required to stop slows the flow of those left turn movements and increases the queues and delays for other vehicles turning left off of Highway 61.

Currently, the school is planning to have all school buses for both the Middle and High School enter and exit the high school site off of Bald Eagle Avenue. This will keep buses from making northbound left turns along Highway 61 at 4th Street, 7th Street, and 8th Street and degrading traffic operations for those northbound left turning movements. Once on site, buses will follow the path shown in **Figure 20**.

Figure 21 – On-site School Bus Routing



RECOMMENDATIONS

The following improvements are recommended when the school expansion project occurs:

1. Install a traffic signal at the intersection of Highway 61 and 8th Street. This signal is planned as part of the Bus Rapid Transit project however it will need to be in place before the 2024 year of opening for the school, which does not match the current plan for the Bus Rapid Transit project.
2. The middle school and high school start times should be at least 30 minutes apart. The analysis suggests that moving the high school start time to 8:30 AM and having the middle school start time at 8:00 AM would improve operations by separating the school arrival peak hour from the AM peak hour of Highway 61.
3. Optimize the signal timing along Highway 61 to provide sufficient green time for the northbound left turn and eastbound phases to improve school traffic operations while maintaining the acceptable splits for through vehicles on Highway 61 based on MnDOT signal timing guidance.
4. Add a leading eastbound protected phase at the intersection of Highway 61 at Buffalo Street during the school dismissal peak hour to help alleviate the long queues on northbound Hugo Road.
5. Convert the intersection of Division Avenue at 8th Street to an all-way stop controlled (or mini-roundabout controlled) intersection. The intersection Division Avenue at 7th Street should have the same traffic control at Division Avenue at 8th Street.
6. The cross-section of 8th Street between Highway 61 and Division Avenue will need to be modified to provide better traffic operations for two-way traffic, which it currently does not provide with parking allowed on both sides of the roadway. Three options for 8th Street were analyzed
 - Alternative 1 – Minimal Construction (**Figure 15**)
 - Two Travel lanes
 - Sidewalk on the south side
 - No on-street parking
 - Keeps the roadway cross section the same
 - Would involve the least reconstruction of 8th Street
 - Alternative 2 – On-Street Parking with No Right Turn Lane (**Figure 16**)
 - Two Travel lanes
 - On-street parking retained on the south side of 8th Street
 - Sidewalk on the south side
 - Expands roadway cross section from 28 feet to 36 feet.
 - Alternative 3 – On-Street Parking with Right Turn Lane (**Figure 17**)
 - Westbound right turn lane at Division Avenue
 - Two Travel lanes
 - On-street parking retained on the south side of 8th Street
 - Sidewalk on the south side
 - Expands roadway cross section from 28 feet to 48 feet.
 - Would provide the best traffic operations along 8th Street and better serve the over 200 westbound right turning vehicles
7. Provide dedicated right and left turn lanes into the school site at the pick up/drop off access on Division Avenue and the main access on Bald Eagle Avenue. Provide a dedicated left turn lane into the student parking access on Division Avenue.
8. Provide improved accessibility and safety for pedestrians and bicyclists in the school site area with the following improvements.

- Add sidewalk/trail on the south side of 8th Street between Highway 61 and Bloom Avenue
 - Add sidewalk/trail on the east side of Bald Eagle Avenue from 12th street to Bald Eagle Boulevard
 - Add sidewalk/trail on the west side of Division Avenue/Street from 12th Street to Park Avenue
 - A marked, mid-block crossing should be added to connect the sidewalk on the west side of Division Avenue to the planned White Bear Lake Art Center parking lot on the east side of the Division Avenue. This crossing should occur south of the school area where Division Avenue is a 2-lane roadway to reduce the pedestrian crossing distance and should have crosswalk warning and advance warning signs.
 - Crosswalks should be marked at all stop controlled roadway and access driveway crossings along Division Avenue and Bald Eagle Avenue to increase the visibility of the pedestrian crossing and improve pedestrian safety.
 - Any uncontrolled marked crosswalks along Division Avenue and Bald Eagle Avenue should have crosswalk warning and advance warning signs to improve pedestrian safety.
 - Any uncontrolled crossings north of the school on Division Avenue or Bald Eagle Avenue should be further investigated with a sidewalk feasibility study.
9. The current school site plan, which has gone through many design iterations, meets many of the design guidelines and best practices outlined in the Texas Transportation Institute's *Operations and Safety Around Schools: Overview of Project Activities and Findings* report which details guidance for providing safe and efficient operations for all modes of travel within a school site.
10. Follow the school's current plan to have all school buses enter and exit the high school site off of Bald Eagle Avenue. This will minimize buses making northbound left turns along Highway 61 at 4th Street, 7th Street, and 8th Street and degrading traffic operations for those northbound left turning movements when buses have to stop at the railroad crossings.
11. Assign student parking in order to distribute trips to specific student parking accesses.

Attachments

Tables A1 and A2 – Crash Analysis Summary

Operational Analysis Tables and Reports

Highway 61 Traffic Signal Turning Movement Counts

Table A1
White Bear Lake High School Expansion Study
2015 to 2019 Crash Data
MnDOT Crash Mapping Software Information



									INTERSECTION CRASH RATE INFORMATION			
Study Intersections			Crash Severity						Crash Rate	Critical Rates	Critical Index	MnDOT Average
Intersection	Control Type	Entering ADT	Fatal	A	B	C	Property	Total	Crash Rate	Crash Rate	Critical Index	Crash Rate
Hwy 61 at 4th St**	Signal (3)	36,860	0	0	7	5	39	51	0.76	0.97	0.79	0.70
Hwy 61 at 7th St**	Signal (3)	27,780	0	1	0	3	6	10	0.20	1.01	0.20	0.70
Hwy 61 at 8th St	Thru/Stop (U)	27,880	0	0	3	0	4	7	0.14	0.35	0.40	0.18
Hwy 61 at Hwy 96**	Signal (4)	26,200	0	0	3	3	17	23	0.48	0.71	0.67	0.45
Hwy 61 at Buffalo St**	Signal (4)	20,370	0	0	1	4	13	18	0.48	0.75	0.64	0.45
Long Ave at 8th St	Thru/Stop (U)	3,190	0	0	0	1	1	2	0.34	0.73	0.47	0.18
Washington Ave at 8th St	Thru/Stop (U)	2,400	0	0	0	0	0	0	0.00	0.83	0.00	0.18
Division Ave at 7th St	All Way	3,200	0	0	1	0	2	3	0.51	1.07	0.48	0.35
Division Ave at 8th St	Thru/Stop (U)	5,140	0	0	0	0	4	4	0.43	0.60	0.72	0.18
Division Ave at High School Exit	Thru/Stop (U)	4,270	0	0	0	0	1	1	0.13	0.64	0.20	0.18
Division Ave at High School Entrance/12th St	Thru/Stop (U)	4,250	0	0	1	1	0	2	0.26	0.64	0.40	0.18
Division Ave at Stillwater St	Thru/Stop (U)	2,130	0	0	0	0	0	0	0.00	0.87	0.00	0.18
Bloom Ave at 4th St	Thru/Stop (U)	11,070	0	0	0	1	2	3	0.15	0.45	0.33	0.18
Bloom Ave at 5th St	All Way	4,540	0	0	0	0	0	0	0.00	0.94	0.00	0.35
Bloom Ave at 7th St	Thru/Stop (U)	2,590	0	0	0	0	0	0	0.00	0.80	0.00	0.18
Bloom Ave at 8th St	Thru/Stop (U)	3,300	0	0	0	0	3	3	0.50	0.72	0.70	0.18
Bald Eagle Ave at 4th St	All Way	11,520	0	0	0	1	7	8	0.38	0.71	0.54	0.35
Bald Eagle Ave at 5th St	Thru/Stop (U)	6,880	0	0	0	0	1	1	0.08	0.53	0.15	0.18
Bald Eagle Ave at 9th St	Thru/Stop (U)	3,770	0	0	1	0	4	5	0.73	0.68	1.08	0.18
Bald Eagle Ave at High School Access/12th St	Thru/Stop (U)	3,300	0	0	0	0	0	0	0.00	0.72	0.00	0.18
Bald Eagle Ave at Stillwater St	Thru/Stop (U)	4,190	0	0	0	1	3	4	0.52	0.65	0.80	0.18
Bald Eagle Ave at Bald Eagle Blvd	All Way	3,930	0	0	0	0	0	0	0.00	0.99	0.00	0.35
Bald Eagle Blvd at Park Ave/Beaver St	All Way	2,960	0	0	0	0	0	0	0.00	1.10	0.00	0.35
Division St at Park Ave	Thru/Stop (U)	2,470	0	0	0	0	0	0	0.00	0.81	0.00	0.18
Eagle St at Park Ave	All Way	3,150	0	0	0	0	1	1	0.17	1.08	0.16	0.35
Bald Eagle Blvd at Buffalo St	All Way	1,110	0	0	0	0	0	0	0.00	1.67	0.00	0.35
Eagle St at Buffalo St	All Way	1,260	0	0	0	0	0	0	0.00	1.58	0.00	0.35
Hugo Rd at Buffalo St	Other	4,280	0	0	0	0	0	0	0.00	0.59	0.00	0.16
TOTAL			0	1	17	20	108	146				
			0%	1%	12%	14%	74%	100%				

NOTES:

**Signalized Intersections

Crash Rates - Number of crashes per million entering vehicles

Exceeding the Calculated Critical Rates indicated a sustained crash problem.

Control Type - Thru/Stop (U) - Urban

MnDOT Statewide Average Rates (2015 Data; 5-Year)*	
Intersection Type	Crash Rate
Signal (3) - High Volume, Low Speed	0.70
Signal (4) - High Volume, High Speed	0.45
Urban Thru/Stop	0.18
All-way Stop	0.35
Other	0.16

Critical Rate Exceeded	Critical Index ≥ 1	Average Rate Exceeded
	Critical Index ≥ 0.85	

Table A2
White Bear Lake High School Expansion Study
2015 to 2019 Crash Data
MnDOT Crash Mapping Software Information



Study Intersections	Diagram - Crash Type							Pedestrian / Bicycle Crashes	
	Rear End	Right Angle	Sideswipe	Head On	Single Vehicle	Other	Total	Pedestrian	Bicycle
Hwy 61 at 4th St**	26	12	2	1	7	3	51	2	2
Hwy 61 at 7th St**	6	0	0	0	3	1	10	1	0
Hwy 61 at 8th St	1	5	0	0	1	0	7	0	0
Hwy 61 at Hwy 96**	15	2	2	2	2	0	23	0	0
Hwy 61 at Buffalo St**	7	5	3	0	2	1	18	0	0
Long Ave at 8th St	1	0	0	0	1	0	2	0	0
Washington Ave at 8th St	0	0	0	0	0	0	0	0	0
Division Ave at 7th St	0	2	0	0	1	0	3	0	0
Division Ave at 8th St	2	0	0	0	0	2	4	0	0
Division Ave at High School Exit	0	1	0	0	0	0	1	0	0
Division Ave at High School Entrance/12th St	1	0	0	0	1	0	2	1	0
Division Ave at Stillwater St	0	0	0	0	0	0	0	0	0
Bloom Ave at 4th St	0	3	0	0	0	0	3	0	0
Bloom Ave at 5th St	0	0	0	0	0	0	0	0	0
Bloom Ave at 7th St	0	0	0	0	0	0	0	0	0
Bloom Ave at 8th St	0	0	0	0	3	0	3	0	0
Bald Eagle Ave at 4th St	4	0	1	0	0	3	8	0	0
Bald Eagle Ave at 5th St	0	1	0	0	0	0	1	0	0
Bald Eagle Ave at 9th St	1	2	0	0	2	0	5	0	0
Bald Eagle Ave at High School Access/12th St	0	0	0	0	0	0	0	0	0
Bald Eagle Ave at Stillwater St	0	1	0	0	0	3	4	0	0
Bald Eagle Ave at Bald Eagle Blvd	0	0	0	0	0	0	0	0	0
Bald Eagle Blvd at Park Ave/Beaver St	0	0	0	0	0	0	0	0	0
Division St at Park Ave	0	0	0	0	0	0	0	0	0
Eagle St at Park Ave	1	0	0	0	0	0	1	0	0
Bald Eagle Blvd at Buffalo St	0	0	0	0	0	0	0	0	0
Eagle St at Buffalo St	0	0	0	0	0	0	0	0	0
Hugo Rd at Buffalo St	0	0	0	0	0	0	0	0	0
TOTAL	65	34	8	3	23	13	146	4	2
	45%	23%	5%	2%	16%	9%	100%		

NOTES:

**Signalized Intersections

Table B1a-1
White Bear Lake High School Expansion Study
2024 Build Conditions (8:30 AM High School Start Time, 8:00 AM Middle School Start Time)
AM Peak Hour (7:30 AM)

AM Peak Hour (7:30 AM)															Vehicle Queuing Information (feet)																
Intersection		Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Left Turn Lane				Through Lane (s)					Right Turn Lane					
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Thru ⁽²⁾ ----->	% Block Left ⁽²⁾ <-----	Link Length (feet)	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Right ⁽²⁾ ----->	% Block Thru ⁽²⁾ ----->	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹		
AM Peak Hour	Hwy 61 at 4th St (Signal)		NB	176	803	47	1,026	58.4	E	6.2	A	2.0	A	15.2	B	17.4	B	190	117	249			1374	71	243				170	20	20
			SB	13	1662	90	1,765	9.0	A	11.5	B	9.1	A	11.4	B			250	20	20		1 %	329	124	323	1 %					
			EB	74	45	234	353	76.8	E	64.1	E	18.2	B	36.7	D			100	69	134		25 %	424	138	333	25 %	16 %	50	74	100	
			WB	65	33	4	102	83.2	F	68.1	E	27.8	C	76.0	E			100	61	138		1 %	1201	42	133						
	Hwy 61 at 7th St (Signal)		NB	160	687	15	862	77.5	E	2.8	A	1.0	A	17.1	B	14.6	B	300	144	368			654	30	283				300		20
			SB		1614	83	1,697			8.8	A	6.0	A	8.7	A								272	98	264						
			EB	54	10	154	218	72.4	E	49.4	D	30.3	C	40.9	D								506	48	128		1 %	235	90	231	
			WB	26	24	7	57	58.1	E	61.4	E	8.0	A	51.9	D								1490	48	117	1 %		120	20	31	
	Hwy 61 at 8th St (Signal) (Planned Signal)		NB	130	605	14	749	69.8	E	4.3	A	1.1	A	14.8	B	17.3	B	230	86	199			272	34	199				130		20
			SB	30	1514	199	1,743	8.6	A	17.0	B	7.6	A	15.8	B			375	20	45	1 %	1018	213	490	4 %			325	50	362	
			EB	77	4	176	257	47.8	D	41.9	D	25.0	C	32.6	C								39	53	80			20	64	87	
			WB	5	8	7	20	80.3	F	61.0	E	6.1	A	46.9	D								1363	20	61	1 %		75	20	30	
	Hwy 61 at Hwy 96 (Signal)		NB		431	155	586			8.4	A	2.1	A	6.8	A	26.1	C						291	54	124						
			SB	56	1321		1,377	65.1	E	16.4	B			18.4	B			250	59	166	1 %	4312	87	257							
			EB											0.0	A																
			WB	347		15	362	88.2	F			17.3	B	85.1	F			1745	362	564								230	27	251	
	Hwy 61 at Buffalo St (Signal)		NB	18	408	20	446	103.4	F	25.6	C	7.0	A	27.4	C	23.9	C	250	20	50			4312	92	219				225		20
			SB	40	1222	302	1,564	74.2	E	13.1	B	4.0	A	12.9	B			240	25	87	2 %	750	129	345	4 %			175	23	256	
			EB	112	32	51	195	83.5	F	99.6	F	19.3	B	69.6	E								113	130	198			55	29	76	
			WB	105	55	53	213	72.6	E	70.1	E	9.9	A	56.8	E								1342	157	340	41 %		80	56	205	
	Long Ave at 8th St		NB										0.0	A	6.7	A							423	24	80						
			SB	28		11	39	32.0	D			12.7	B	25.7			D														
			EB	15	229		244	10.0	B	11.6	B			11.5			B					10 %	208	45	204	10 %					
			WB		312	25	337			0.9	A	0.4	A	0.9			A						39	20	51						
	Washington Ave at 8th St		NB	3		2	5	7.4	A			3.1	A	5.7	A	1.4	A						270	20	31						
			SB	1			1	7.1	A					7.1	A								353	20	20						
			EB		239	1	240			2.1	A	1.7	A	2.1	A								252	20	48						
			WB	2	319	1	322	2.0	A	0.8	A	0.5	A	0.8	A								208	20	30						
	Division Ave at 7th St		NB	1	13	18	32	5.0	A	6.4	A	3.0	A	4.3	A	7.5	A						589	20	49						
			SB	139	12	5	156	6.9	A	6.0	A	7.5	A	6.8	A								290	36	68						
			EB	4	62	1	67	4.9	A	6.2	A	0.0	A	6.1	A								811	28	60						
			WB	8	95	162	265	8.7	A	9.4	A	8.2	A	8.7	A								506	81	189						
	Division Ave at 8th St (All-way Stop)		NB	16	157	7	180	9.4	A	11.5	B	6.2	A	11.0	B	10.0	B						290	59	162						
			SB	110	143	133	386	9.2	A	9.7	A	7.1	A	8.7	A								893	76	146						
			EB	80	124	1	205	9.8	A	9.8	A	7.1	A	9.8	A								589	52	130						
			WB	15	128	179	322	9.0	A	11.6	B	10.9	B	11.1	B								252	90	209						
	Division Ave at New HS Access		NB	167	248		415	6.4	A	1.9	A			3.6	A	2.8	A	200	34	84											
			SB		387	66	453			2.1	A	1.5	A	2.0	A								133	20	26						
			EB											0.0	A																
			WB											0.0	A																
Divison St at Pick Up/Drop Off Access		NB	152	96		248	0.2	A	0.1	A			0.2	A	6.2	A	100		20									200	36	115	
		SB		273	88	361			11.2	B	5.5	A	9.9	A								382	70	160					355	42	117
		EB	57		180	237	8.4	A			6.3	A	6.8	A			710	23	61												
		WB											0.0	A																	
Divison St at 12th St		NB		153	1	154			0.4	A	0.0	A	0.4	A	0.8	A															
		SB		355		355			0.9	A			0.9	A																	
		EB											0.0	A																	
		WB	5		2	7	6.7	A			2.4	A	5.3	A								727	20	31							
Bloom Ave at 4th St		NB	3	2	3	8	8.2	A	8.1	A	5.1	A	7.4	A	3.3	A						254	20	36							
		SB	44	3	30	77	9.4	A	4.1	A	6.2	A	7.7	A								324	34	69							
		EB	67	304	7	378	5.2	A	2.5	A	1.3	A	2.9	A								899	20	103							
		WB	12	196	90	298	4.0	A	2.5	A	1.7	A	2.3	A								424	20	40							
Bloom Ave at 5th St		NB	7	109	42	158	4.6	A	6.2	A	3.6	A	5.5	A	5.3	A						324	40	78							
		SB	2	50	19	71	5.0	A	6.3	A	3.5	A	5.4	A								655	32	62							
		EB	32	34	19	85	5.2	A	6.0	A	3.1	A	5.0	A								902	33	65							
		WB	12	12	2	26	4.7	A	6.3	A	3.6	A	5.4	A								599	20	40							
Bald Eagle Ave at 4th St		NB	9	68	54	131	6.7	A	7.8	A	4.7	A	6.4	A	7.6	A						709	40	75							
		SB	176	72	31	279	7.1	A	8.3	A	5.4	A	7.2	A								338	57	110							
		EB	95	151	24	270	8.1	A	8.8	A	5.7	A	8.3	A								730	58	117							
		WB	31	121	77	229	7.5	A																							

Table B1a-2
White Bear Lake High School Expansion Study
2024 Build Conditions (8:30 AM High School Start Time, 8:00 AM Middle School Start Time)
School Dismissal Peak Hour (2:45 PM)

School Dismissal Peak Hour (2:45 PM)															Vehicle Queing Information (feet)															
Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Left Turn Lane				Through Lane (s)					Right Turn Lane					
		L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Thru ⁽²⁾ ----->	% Block Left ⁽²⁾ <-----	Link Length (feet)	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Right ⁽²⁾ ----->	% Block Thru ⁽²⁾ <-----	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹		
Hwy 61 at 4th St (Signal)	NB	234	1411	129	1,774	61.8	E	13.5	B	5.2	A	19.3	B	21.5	C	190	165	303		4 %	1374	181	416	5 %			170	20	188	
	SB	26	842	70	938	51.3	D	15.2	B	12.8	B	15.9	B			250	20	55				325	108	232						
	EB	113	66	175	354	60.8	E	43.7	D	4.9	A	30.3	C			100	85	134		21 %	424	73	231	21 %	1 %	50	38	100		
	WB	100	70	14	184	60.8	E	50.7	D	31.2	C	54.4	D			100	77	160		6 %	1199	74	180							
Hwy 61 at 7th St (Signal)	NB	82	1439	29	1,550	13.6	B	2.8	A	1.3	A	3.3	A	5.5	A	300	23	75				657	25	114						
	SB		834	38	872			3.1	A	1.4	A	3.0	A									264	20	80						
	EB	58	15	115	188	54.1	D	32.8	C	11.7	B	25.8	C									507	48	133			235	42	141	
	WB	21	10	15	46	51.0	D	49.8	D	21.3	C	40.4	D									1489	27	86			120	20	54	
Hwy 61 at 8th St (Signal) (Planned Signal)	NB	98	1391	19	1,508	64.6	E	6.2	A	1.5	A	9.9	A	11.8	B	230	69	196				264	90	231	3 %		130		20	
	SB	34	783	81	898	56.3	E	9.8	A	3.0	A	10.9	B			375	23	72				1040	88	222			325	20	49	
	EB	117	6	82	205	38.9	D	36.3	D	8.5	A	27.0	C									55	63	87			30	32	75	
	WB	8	9	8	25	52.5	D	47.0	D	13.3	B	37.4	D									1363	20	56			75	20	35	
Hwy 61 at Hwy 96 (Signal)	NB		1022	299	1,321			7.4	A	3.1	A	6.5	A	13.2	B							282	99	199	1 %		170	20	78	
	SB	51	681		732	63.4	E	10.9	B			15.0	B			250	53	148				4312	56	186						
	EB											0.0	A																	
	WB	190		30	220	53.0	D			3.6	A	46.1	D				1745	148	271								230	20	51	
Hwy 61 at Buffalo St (Signal)	NB	50	935	67	1,052	74.3	E	28.4	C	11.0	B	29.3	C	27.5	C	250	32	186		3 %	4312	176	385	1 %		225	20	20		
	SB	38	653	123	814	64.0	E	13.5	B	2.2	A	14.1	B			240	20	68				750	83	174			175	20	36	
	EB	192	41	35	268	68.0	E	51.6	D	7.9	A	57.0	E									113	155	210			55	21	65	
	WB	43	42	65	150	45.7	D	48.4	D	8.2	A	32.0	C									1342	68	158	9 %		80	28	119	
Long Ave at 8th St	NB											0.0	A	4.4	A							427	21	56						
	SB	24		9	33	16.5	C			4.3	A	13.0	B									208	23	120	7 %					
	EB	11	179		190	5.3	A	6.7	A			6.6	A									55	20	23						
	WB		153	35	188			0.8	A	0.5	A	0.7	A																	
Washington Ave at 8th St	NB	9			9	5.7	A					5.7	A	1.2	A							270	20	31						
	SB											0.0	A																	
	EB		186	5	191			1.6	A	2.1	A	1.6	A																	
	WB	3	157		160	1.4	A	0.6	A			0.6	A																	
Division Ave at 7th St	NB		17	15	32			6.1	A	2.8	A	4.6	A	5.9	A							589	20	60						
	SB	122	22	4	148	6.8	A	7.9	A	9.0	A	7.0	A									290	38	80						
	EB	5	57	2	64	4.4	A	6.3	A	4.6	A	6.1	A									811	31	66						
	WB	14	31	87	132	5.7	A	6.5	A	3.8	A	4.7	A									507	39	72						
Division Ave at 8th St (All-way Stop)	NB	6	100	5	111	6.1	A	7.1	A	4.1	A	6.9	A	7.3	A							290	37	77						
	SB	113	134	64	311	7.6	A	8.3	A	4.7	A	7.3	A									873	59	134						
	EB	85	77		162	8.2	A	8.2	A			8.2	A									589	48	128						
	WB	14	46	108	168	8.0	A	8.7	A	5.7	A	6.7	A									252	55	151						
Division Ave at New HS Access	NB		295		295			1.7	A			1.7	A	2.4	A															
	SB		237		237			1.5	A			1.5	A																	
	EB	27		69	96	8.4	A			5.4	A	6.3	A									537	36	93						
	WB											0.0	A																	
Division St at Pick Up/Drop Off Access	NB	122	200		322	0.2	A	0.2	A			0.2	A	3.1	A												200	31	65	
	SB		116	71	187			7.9	A	4.1	A	6.4	A									382	41	88				355	25	62
	EB	71		121	192	7.7	A			3.6	A	5.1	A				710	25	71											
	WB											0.0	A																	
Divison St at 12th St	NB		267	5	272			0.4	A	0.2	A	0.4	A	0.5	A															
	SB	1	184		185	0.0	A	0.6	A			0.6	A									1049		20						
	EB											0.0	A																	
	WB	3		1	4	5.5	A			2.6	A	4.1	A									727	20	31						
Bloom Ave at 4th St	NB	6	4	8	18	6.9	A	11.4	B	4.1	A	7.3	A	3.5	A							300	20	48						
	SB	45	8	36	89	12.6	B	12.1	B	6.5	A	10.3	B									324	35	70						
	EB	46	298	11	355	5.5	A	2.6	A	2.2	A	3.0	A									898	20	99						
	WB	8	339	28	375	4.5	A	2.1	A	1.9	A	2.1	A									424	20	70						
Bloom Ave at 5th St	NB	16	26	36	78	4.7	A	5.9	A	3.4	A	4.5	A	5.2	A							324	28	51						
	SB	4	56	22	82	4.4	A	6.2	A	3.3	A	5.3	A									655	32	54						
	EB	14	30	7	51	5.0	A	6.2	A	3.2	A	5.5	A									902	27	65						
	WB	26	51	1	78	4.8	A	6.3	A	3.4	A	5.7	A																	

Table B1b-1
White Bear Lake High School Expansion Study
2024 Build Conditions (7:30 AM High School Start Time, 8:00 AM Middle School Start Time)
AM Peak Hour (7:00 AM)

AM Peak Hour (7:00 AM)															Vehicle Queuing Information (feet)																
Intersection		Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Left Turn Lane				Through Lane (s)					Right Turn Lane					
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Thru ⁽²⁾ ----->	% Block Left ⁽²⁾ <-----	Link Length (feet)	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Right ⁽²⁾ ----->	% Block Thru ⁽²⁾ ----->	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹		
AM Peak Hour	Hwy 61 at 4th St (Signal)		NB	137	712	27	876	65.5	E	4.9	A	1.5	A	13.9	B	25.3	C	190	103	211			1374	59	221				170		20
			SB	11	2013	109	2,133	18.8	B	23.5	C	20.1	C	23.3	C			250	20	74		21 %	329	283	373	21 %					
			EB	75	31	267	373	85.4	F	62.2	E	47.3	D	55.8	E			100	71	134		8 %	424	242	413	8 %	33 %	50	90	100	
			WB	58	29	3	90	69.6	E	61.8	E	15.8	B	64.9	E			100	48	112		1 %	1201	36	109						
	Hwy 61 at 7th St (Signal)		NB	134	625	17	776	79.6	E	2.8	A	0.8	A	15.6	B	18.4	B	300	117	330			654	33	320						
			SB		1948	99	2,047			14.1	B	11.7	B	14.0	B								272	171	310						
			EB	50	10	168	228	74.1	E	59.9	E	49.4	D	55.4	E								506	60	223		1 %	235	120	235	
			WB	31	19	7	57	73.6	E	77.3	E	7.4	A	67.7	E								1490	52	147	2 %		120	20	55	
	Hwy 61 at 8th St (Signal) (Planned Signal)		NB	111	558	13	682	72.8	E	5.2	A	0.9	A	16.3	B	29.6	C	230	90	248			272	40	253				130		20
			SB	34	1861	224	2,119	16.3	B	35.7	D	17.5	B	33.4	C			375	35	242		13 %	1018	451	769	19 %		325	160	365	
			EB	72	4	181	257	51.0	D	45.4	D	28.5	C	34.7	C								39	46	72			20	67	93	
			WB	3	10	6	19	25.0	C	49.6	D	5.6	A	34.1	C								1363	20	57			75	20	31	
	Hwy 61 at Hwy 96 (Signal)		NB		373	144	517			9.5	A	2.1	A	7.4	A	28.7	C						291	49	121						
			SB	68	1600		1,668	72.6	E	20.3	C			22.3	C			250	68	200	1 %	4312	136	328							
			EB											0.0	A																
			WB	377		10	387	86.2	F			20.2	C	84.7	F								1745	393	669				230	20	202
	Hwy 61 at Buffalo St (Signal)		NB	13	356	14	383	105.6	F	26.9	C	7.0	A	28.7	C	25.5	C	250	20	21			4312	90	225				175	29	284
			SB	34	1456	268	1,758	80.0	F	15.2	B	5.1	A	14.9	B			240	21	168	4 %		750	188	383	7 %			55	41	132
			EB	109	34	71	214	70.7	E	80.3	F	22.8	C	57.0	E								113	122	204			80	65	205	
			WB	141	52	66	259	79.4	E	85.9	F	12.0	B	64.4	E								1342	191	411	53 %					
	Long Ave at 8th St		NB										0.0	A	12.3	B															
			SB	35		14	49	61.4	F			32.8	D	53.7			F						423	41	117						
			EB	19	223		242	15.1	C	20.5	C			20.1			C					22 %	208	84	212	22 %					
			WB		310	35	345			0.8	A	0.4	A	0.8			A						39	20	48						
	Washington Ave at 8th St		NB	4		4	8	18.4	C			5.0	A	10.0	B	2.1	A						270	20	35						
			SB	2			2	12.1	B					12.1	B								353	20	20						
			EB		236	3	239			2.9	A	0.9	A	2.9	A								252	20	87						
			WB	2	321	1	324	3.3	A	1.2	A	0.6	A	1.2	A								208	20	59						
	Division Ave at 7th St		NB	2	18	28	48	5.7	A	6.3	A	3.0	A	4.3	A	7.8	A						589	25	58						
			SB	143	17	7	167	6.8	A	7.3	A	8.2	A	6.9	A								290	37	80						
			EB	6	57	1	64	5.6	A	6.3	A	2.6	A	6.1	A								811	29	59						
			WB	8	103	141	252	11.9	B	9.6	A	9.2	A	9.5	A								506	82	206						
	Division Ave at 8th St (All-way Stop)		NB	9	145	11	165	11.1	B	12.2	B	7.3	A	11.8	B	11.5	B						290	56	162						
			SB	112	139	167	418	11.7	B	11.3	B	9.2	A	10.6	B								893	88	238						
			EB	74	116	1	191	9.2	A	9.2	A	7.0	A	9.2	A								589	50	108						
			WB	27	140	158	325	13.2	B	13.1	B	14.8	B	13.9	B								252	101	233						
	Division Ave at New HS Access		NB	113	263		376	6.4	A	1.9	A			3.3	A	2.5	A	200	28	66											
			SB		420	43	463			1.9	A	1.4	A	1.9	A								133	20	20						
			EB											0.0	A																
			WB											0.0	A																
Divison St at Pick Up/Drop Off Access		NB	161	102		263	0.2	A	0.1	A			0.2	A	6.4	A												200	37	110	
		SB		270	92	362			11.8	B	7.4	A	10.7	B								382	68	137				355	42	102	
		EB	61		193	254	8.8	A			6.1	A	6.7	A				710	24	62											
		WB											0.0	A																	
Divison St at 12th St		NB		162	1	163			0.5	A	0.2	A	0.5	A	1.0	A															
		SB		354		354			1.1	A			1.1	A																	
		EB											0.0	A																	
		WB	6		4	10	6.0	A			2.5	A	5.2	A								727	20	36							
Bloom Ave at 4th St		NB	1	3	3	7	23.2	C	7.8	A	8.4	A	10.7	B	11.3	B						254	20	31							
		SB	44	3	34	81	52.5	F	24.0	C	49.0	E	49.4	E								324	57	139							
		EB	75	328	7	410	12.3	B	9.4	A	7.3	A	9.9	A								899	61	239							
		WB	8	186	79	273	4.8	A	2.5	A	1.6	A	2.3	A								424	20	53							
Bloom Ave at 5th St		NB	7	99	51	157	5.3	A	6.3	A	3.7	A	5.5	A	9.6	A						324	42	78							
		SB	3	48	17	68	6.0	A	25.8	D	25.6	D	25.2	D								655	43	130							
		EB	37	56	21	114	5.7	A	6.3																						

Table B1b-2
White Bear Lake High School Expansion Study
2024 Build Conditions (7:30 AM High School Start Time, 8:00 AM Middle School Start Time)
School Dismissal Peak Hour (2:15 PM)

School Dismissal Peak Hour (2:15 PM)															Vehicle Queuing Information (feet)														
Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Left Turn Lane				Through Lane (s)					Right Turn Lane				
		L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Thru ⁽²⁾ ----->	% Block Left ⁽²⁾ <-----	Link Length (feet)	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Right ⁽²⁾ ----->	% Block Thru ⁽²⁾ <-----	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	
Hwy 61 at 4th St (Signal)	NB	209	1208	115	1,532	60.1	E	12.0	B	4.5	A	18.2	B	21.0	C	190	153	294		3 %	1374	146	348	3 %		170	20	235	
	SB	20	799	65	884	58.0	E	14.7	B	11.8	B	15.5	B			250	20	49			325	92	202						
	EB	112	49	165	326	63.0	E	42.1	D	5.0	A	29.6	C			100	79	134	16 %		424	64	284	16 %		50	30	99	
	WB	109	70	12	191	57.2	E	47.4	D	29.8	C	51.7	D			100	83	154	7 %		1199	77	195						
Hwy 61 at 7th St (Signal)	NB	63	1223	35	1,321	10.2	B	2.5	A	1.3	A	2.8	A	5.2	A	300	20	56			657	21	104			300		20	
	SB		770	51	821			2.6	A	1.3	A	2.5	A								264	20	76						
	EB	59	17	112	188	53.6	D	45.2	D	8.9	A	28.2	C								507	59	151			235	36	95	
	WB	21	9	9	39	45.8	D	51.8	D	15.2	B	40.3	D								1489	29	92			120	20	38	
Hwy 61 at 8th St (Signal) (Planned Signal)	NB	87	1180	19	1,286	64.6	E	5.0	A	0.8	A	8.7	A	10.5	B	230	62	141			264	66	160	1 %		130		20	
	SB	32	738	93	863	61.2	E	7.7	A	2.2	A	8.8	A			375	20	64			1040	65	173			325	20	38	
	EB	113	5	79	197	39.3	D	19.4	B	7.0	A	26.4	C								55	62	84			30	31	69	
	WB	8	8	10	26	46.4	D	51.1	D	11.3	B	34.3	C								1363	20	56			75	20	35	
Hwy 61 at Hwy 96 (Signal)	NB		922	252	1,174			6.1	A	2.6	A	5.3	A	11.7	B						282	76	193			170	20	72	
	SB	45	645		690	59.3	E	9.6	A			12.9	B			250	45	123			4312	51	165						
	EB											0.0	A																
	WB	178		28	206	52.7	D			3.2	A	46.0	D			1745	128	252								230	20	100	
Hwy 61 at Buffalo St (Signal)	NB	40	857	52	949	82.7	F	23.5	C	9.9	A	24.8	C	23.6	C	250	20	74	2 %		4312	146	371	1 %		225		20	
	SB	44	607	110	761	61.2	E	10.3	B	1.6	A	11.8	B			240	21	81			750	65	153			175	20	22	
	EB	167	26	37	230	61.6	E	48.2	D	8.1	A	51.4	D								113	142	203			55	20	55	
	WB	43	40	46	129	45.0	D	51.3	D	8.1	A	32.4	C								1342	59	128	6 %		80	23	68	
Long Ave at 8th St	NB											0.0	A	4.8	A														
	SB	20		9	29	19.4	C			5.4	A	13.8	B								427	20	64						
	EB	7	180		187	2.6	A	7.5	A			7.3	A								208	29	93	9 %					
	WB		153	35	188			0.8	A	0.5	A	0.7	A								55		20						
Washington Ave at 8th St	NB	17		2	19	6.1	A			3.2	A	5.8	A	1.4	A						270	20	47						
	SB											0.0	A																
	EB		183	9	192			1.6	A	1.4	A	1.6	A																
	WB	5	157		162	2.6	A	0.6	A			0.7	A								208	20	29						
Division Ave at 7th St	NB		11	11	22			5.6	A	3.1	A	4.1	A	5.8	A						589	20	44						
	SB	122	22	4	148	6.7	A	7.9	A	7.7	A	6.9	A								290	34	63						
	EB	3	58	2	63	4.3	A	6.2	A	2.6	A	6.0	A								811	28	60						
	WB	14	44	64	122	5.3	A	6.2	A	3.7	A	4.8	A								507	37	67						
Division Ave at 8th St (All-way Stop)	NB	4	69	5	78	5.0	A	6.7	A	3.9	A	6.3	A	7.0	A						290	31	60						
	SB	108	134	100	342	8.0	A	8.1	A	5.3	A	7.3	A								873	58	125						
	EB	89	80		169	7.4	A	7.8	A			7.6	A								589	46	101						
	WB	14	72	90	176	6.0	A	8.3	A	4.8	A	6.2	A								252	51	103						
Division Ave at New HS Access	NB		248		248			1.5	A			1.5	A	2.8	A														
	SB		255		255			1.9	A			1.9	A																
	EB	35		89	124	10.2	B			6.3	A	7.4	A								537	38	106						
	WB											0.0	A																
Divison St at Pick Up/Drop Off Access	NB	84	199		283	0.3	A	0.2	A			0.2	A	3.5	A	500		20								200	26	60	
	SB		171	48	219			7.9	A	3.5	A	7.0	A								382	46	102				200	26	60
	EB	49		84	133	7.5	A			3.5	A	4.9	A			710	20	56								355	23	62	
	WB											0.0	A																
Divison St at 12th St	NB		245	3	248			0.4	A	0.0	A	0.4	A	0.5	A														
	SB	1	214		215	1.5	A	0.5	A			0.5	A																
	EB											0.0	A																
	WB	5		3	8	5.3	A			3.2	A	4.4	A								727	20	31						
Bloom Ave at 4th St	NB	6	4	10	20	12.6	B	13.8	B	3.9	A	8.9	A	3.8	A						300	20	40						
	SB	54	8	41	103	12.5	B	10.6	B	7.6	A	10.3	B								324	42	90						
	EB	49	257	7	313	5.9	A	2.6	A	2.4	A	3.1	A								898	20	102						
	WB	8	305	28	341	4.0	A	2.1	A	1.6	A	2.1	A								424	20	52						
Bloom Ave at 5th St	NB	14	33	34	81	5.1	A	6.0	A	3.3	A	4.7	A	5.2	A						324	33	70						
	SB	4	62	21	87	5.6	A	6.4	A	3.3	A	5.7	A								655	36	71						
	EB	20	28	7	55	4.7	A	5.4	A	2.8	A	4.8	A								902	28	53						
	WB	34	32	1	67	4.9	A	6.1	A	1.4	A	5.5	A								599	32	68						
Bald Eagle Ave at 4th St	NB	19	50	56	125	5.8	A	7.4	A	4.0	A	5.6	A	8.1	A						709	39	70						
	SB	98	49	65	212	6.2	A	7.1	A	4.4	A	5.8	A								338	47	91						
	EB	27	158	6	191	6.2	A	7.8	A	5.7	A	7.5	A								730	47	94						
	WB	72	145	137	354	10.8	B	12.2	B	9.2	A	10.7	B								898	98	223						
Bald Eagle Ave at 5th St	NB		202	12	214			1.1	A	0.9	A	1.1	A	1.9	A														
	SB	43	197		240	3.2	A	1.2	A			1.6	A															</	

Table B2a-2
White Bear Lake High School Expansion Study
2028 Build Conditions (8:30 AM High School Start Time, 8:00 AM Middle School Start Time)
School Dismissal Peak Hour (2:45 PM)

School Dismissal Peak Hour (2:45 PM)														Vehicle Queuing Information (feet)																
Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Left Turn Lane				Through Lane (s)					Right Turn Lane					
		L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Thru ⁽²⁾ ----->	% Block Left ⁽²⁾ <-----	Link Length (feet)	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Right ⁽²⁾ ----->	% Block Thru ⁽²⁾ ----->	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹		
Hwy 61 at 4th St (Signal)	NB	238	1529	130	1,897	65.7	E	14.7	B	6.4	A	20.5	C	22.1	C	190	174	298		5 %	1374	195	410	6 %			170	20	287	
	SB	26	931	73	1,030	57.1	E	15.9	B	12.1	B	16.5	B			250	20	59				325	119	255						
	EB	113	67	186	366	59.4	E	44.3	D	6.3	A	29.2	C			100	77	134		22 %	424	77	290	22 %	1 %	50	40	98		
	WB	103	72	14	189	61.5	E	52.0	D	35.4	D	55.6	E			100	77	169		6 %	1199	75	190							
Hwy 61 at 7th St (Signal)	NB	95	1552	29	1,676	16.3	B	3.8	A	1.5	A	4.5	A	6.4	A	300	30	108			657	44	156							
	SB		907	38	945			3.4	A	1.7	A	3.3	A									264	20	84						
	EB	58	20	137	215	54.3	D	47.5	D	12.9	B	26.6	C									507	54	138			235	50	126	
	WB	21	13	15	49	47.2	D	54.0	D	25.3	C	41.0	D									1489	27	80			120	20	65	
Hwy 61 at 8th St (Signal) (Planned Signal)	NB	113	1491	19	1,623	62.8	E	7.2	A	1.7	A	11.0	B	12.6	B	230	82	172		1 %	264	112	266	5 %			130	20	20	
	SB	34	840	86	960	55.7	E	10.5	B	3.2	A	11.4	B			375	22	85				1040	95	228			325	20	40	
	EB	127	6	99	232	39.3	D	34.4	C	8.9	A	26.0	C									55	64	86			30	39	80	
	WB	8	9	8	25	43.0	D	45.5	D	19.0	B	36.7	D									1363	20	56			75	20	37	
Hwy 61 at Hwy 96 (Signal)	NB		1093	309	1,402			7.2	A	3.4	A	6.4	A	13.0	B						282	100	207	1 %			170	20	154	
	SB	54	726		780	62.0	E	11.6	B			15.5	B			250	54	142				4312	61	176						
	EB											0.0	A																	
	WB	197		30	227	53.6	D			4.3	A	46.5	D				1745	145	308								230	20	151	
Hwy 61 at Buffalo St (Signal)	NB	53	1003	68	1,124	77.4	E	29.8	C	11.6	B	30.8	C	28.4	C	250	29	134		5 %	4312	195	421	2 %			225	20	20	
	SB	39	698	138	875	65.9	E	14.6	B	2.1	A	14.8	B			240	20	76				750	99	227	1 %			175	20	26
	EB	225	46	37	308	68.1	E	60.6	E	9.8	A	59.8	E									113	160	220			55	20	66	
	WB	45	45	65	155	50.0	D	50.3	D	10.2	B	33.3	C									1342	63	144	10 %			80	29	76
Long Ave at 8th St	NB											0.0	A	4.6	A						427	20	52							
	SB	24		9	33	15.9	C			5.5	A	12.7	B									208	29	150	8 %					
	EB	11	207		218	6.8	A	7.0	A			7.0	A									55		20						
	WB		171	37	208			0.9	A	0.5	A	0.8	A																	
Washington Ave at 8th St	NB	9			9	6.2	A					6.2	A	1.3	A						270	20	43							
	SB											0.0	A																	
	EB		214	5	219			1.6	A	1.7	A	1.6	A									252	20	28						
	WB	3	175		178	3.1	A	0.7	A			0.7	A									208		22						
Division Ave at 7th St	NB		17	15	32			5.9	A	2.9	A	4.4	A	5.9	A						589	22	55							
	SB	142	22	4	168	6.8	A	8.2	A	8.5	A	7.0	A									290	37	71						
	EB	5	59	2	66	5.3	A	6.1	A	2.1	A	5.9	A									811	31	60						
	WB	14	31	102	147	5.5	A	7.1	A	4.3	A	5.0	A									507	42	85						
Division Ave at 8th St (All-way Stop)	NB	6	118	5	129	5.2	A	7.5	A	4.8	A	7.3	A	8.0	A						290	39	84							
	SB	135	155	64	354	9.7	A	9.5	A	6.0	A	8.9	A									873	70	202						
	EB	85	79		164	8.1	A	8.1	A			8.1	A									589	46	105						
	WB	14	46	126	186	7.1	A	9.0	A	5.9	A	6.7	A									252	56	125						
Division Ave at New HS Access	NB		326		326			1.7	A			1.7	A	2.5	A															
	SB		272		272			1.4	A			1.4	A																	
	EB	33		84	117	11.6	B			6.4	A	7.7	A									537	39	106						
	WB											0.0	A																	
Division St at Pick Up/Drop Off Access	NB	152	207		359	0.3	A	0.2	A			0.2	A	3.7	A	500		20									200	36	65	
	SB		120	87	207			8.4	A	4.6	A	6.8	A									382	43	75				355	33	100
	EB	87		152	239	8.5	A			4.5	A	5.9	A				710	28	81											
	WB											0.0	A																	
Division St at 12th St	NB		290	5	295			0.5	A	0.2	A	0.5	A	0.6	A															
	SB	1	201		202	4.2	A	0.7	A			0.7	A									1049	20	20						
	EB											0.0	A																	
	WB	3		1	4	5.9	A			4.7	A	5.5	A																	
Bloom Ave at 4th St	NB	6	4	8	18	9.0	A	9.1	A	4.3	A	6.8	A	3.6	A						300	20	43							
	SB	50	8	36	94	13.4	B	8.8	A	8.2	A	10.8	B									324	38	78						
	EB	46	303	11	360	5.9	A	2.6	A	2.7	A	3.0	A									898	20	82						
	WB	8	347	28	383	4.1	A	2.2	A	1.7	A	2.2	A									424	20	53						
Bloom Ave at 5th St	NB	16	26	40	82	4.9	A	6.0	A	3.5	A	4.6	A	5.3	A						324	33	69							
	SB	4	61	22	87	4.3	A	6.4	A	3.2	A	5.4	A									655	33	72						
	EB	14	30	7	51	4.3	A	6.4	A	2.7	A	5.3																		

Table B2b-1
White Bear Lake High School Expansion Study
2024 Build Conditions (7:30 AM High School Start Time, 8:00 AM Middle School Start Time)
AM Peak Hour (7:00 AM)

AM Peak Hour (7:00 AM)															Vehicle Queuing Information (feet)															
Intersection		Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Left Turn Lane				Through Lane (s)					Right Turn Lane				
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Thru ⁽²⁾ ----->	% Block Left ⁽²⁾ <-----	Link Length (feet)	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Right ⁽²⁾ ----->	% Block Thru ⁽²⁾ ----->	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	
Hwy 61 at 4th St (Signal)	NB	149	798	27	974	76.8	E	6.0	A	1.6	A	16.8	B	29.0	C	190	126	271			1374	86	324					170		20
	SB	11	2177	109	2,297	16.8	B	27.1	C	23.2	C	26.9	C			250	20	201		28 %	329	320	355	28 %						
	EB	77	31	281	389	87.8	F	68.6	E	54.3	D	62.3	E			100	75	134		11 %	424	287	438	11 %	38 %	50	92	100		
	WB	62	29	3	94	66.9	E	63.6	E	33.5	C	64.8	E			100	55	125			1201	34	111							
	Hwy 61 at 7th St (Signal)	NB	161	690	17	868	97.9	F	3.3	A	0.9	A	20.6	C	23.8	C	300	160	419			654	65	501				300		20
		SB		2096	99	2,195			19.0	B	15.2	B	18.8	B								272	226	321						
		EB	50	13	192	255	73.9	E	83.4	F	58.5	E	63.1	E								506	75	296	2 %	2 %	235	152	289	
		WB	31	23	7	61	68.6	E	78.9	E	11.2	B	67.9	E								1490	63	172	4 %		120	20	54	
	Hwy 61 at 8th St (Signal) (Planned Signal)	NB	137	597	13	747	85.4	F	5.4	A	1.3	A	19.9	B	51.1	D	230	110	257			272	55	269				130		20
		SB	34	1991	239	2,264	33.7	C	68.0	E	43.9	D	64.8	E			375	89	549		28 %	1018	756	1051	34 %		325	248	365	
		EB	77	4	200	281	42.5	D	52.2	D	28.7	C	32.7	C								39	43	73			20	68	83	
		WB	3	10	6	19	82.2	F	53.1	D	6.3	A	40.1	D								1363	20	77	2 %		75	20	31	
	Hwy 61 at Hwy 96 (Signal)	NB		395	149	544			9.4	A	2.3	A	7.5	A	37.6	D						291	55	130						
		SB	70	1710		1,780	82.4	F	36.7	D			38.6	D			250	98	274		10 %	4312	262	665						
		EB											0.0	A																
		WB	389		10	399	78.8	E			22.6	C	77.0	E								1745	359	579				230	20	202
	Hwy 61 at Buffalo St (Signal)	NB	13	377	14	404	113.1	F	27.9	C	6.6	A	29.5	C	27.0	C	250	20	35			4312	92	220				175	42	310
		SB	36	1564	310	1,910	75.3	E	17.0	B	6.5	A	16.4	B			240	24	126		6 %	750	219	484	8 %			55	48	120
		EB	120	37	73	230	77.9	E	91.7	F	28.1	C	64.4	E								113	141	207				20	68	83
		WB	143	56	67	266	83.1	F	82.2	F	12.6	B	64.1	E								1342	194	438	57 %		80	70	205	
	Long Ave at 8th St	NB											0.0	A	11.9	B														
		SB	37		14	51	74.6	F			27.7	D	61.1	F								423	38	126						
		EB	19	243		262	13.0	B	20.5	C			20.0	C							25 %	208	101	215	25 %					
		WB		351	37	388			0.8	A	0.4	A	0.8	A								39	20	48						
	Washington Ave at 8th St	NB	4		4	8	23.2	C			10.2	B	14.1	B	2.9	A						270	20	40						
		SB	2			2	6.1	A					6.1	A								353	20	30						
		EB		256	3	259		2.1	A	1.8	A	2.1	A								252	20	72							
		WB	2	363	1	366	5.3	A	3.1	A	0.0	A	3.1	A								208	20	95						
	Division Ave at 7th St	NB	2	18	28	48	5.7	A	6.8	A	3.1	A	4.4	A	8.3	A						589	27	60						
		SB	168	17	7	192	7.2	A	7.4	A	7.9	A	7.3	A								290	39	70						
		EB	6	57	1	64	5.5	A	6.4	A	2.3	A	6.2	A								811	31	62						
		WB	8	106	169	283	10.7	B	10.4	B	10.1	B	10.2	B								506	98	204						
	Division Ave at 8th St (All-way Stop)	NB	9	173	11	193	10.2	B	15.3	C	9.7	A	14.8	B	15.5	C						290	74	191						
		SB	132	164	167	463	17.9	C	16.6	C	13.0	B	15.8	C								893	114	290						
		EB	74	116	1	191	8.9	A	9.0	A	3.9	A	8.9	A								589	49	100						
		WB	27	146	192	365	16.3	C	16.7	C	20.5	C	18.8	C								252	124	253						
	Division Ave at New HS Access	NB	138	300		438	8.0	A	2.0	A			3.8	A	2.8	A	200	35	83											
		SB		465	53	518			2.0	A	1.5	A	1.9	A								133	20	32						
		EB											0.0	A																
		WB											0.0	A																
Divison St at Pick Up/Drop Off Access	NB	198	102		300	0.3	A	0.1	A			0.2	A	9.8	A	100		20									200	50	175	
	SB		282	115	397			19.4	C	9.4	A	16.4	C							2 %	382	90	226	2 %			355	58	182	
	EB	76		236	312	12.5	B			10.7	B	11.2	B			710	32	90												
	WB											0.0	A																	
Divison St at 12th St	NB		177	1	178			0.5	A	0.0	A	0.5	A	1.0	A															
	SB		389		389			1.1	A			1.1	A								1049	20	20							
	EB											0.0	A																	
	WB	6		4	10	7.9	A			3.3	A	5.9	A								727	20	31							
Bloom Ave at 4th St	NB	1	3	3	7	9.6	A	12.7	B	5.3	A	8.7	A	8.5	A						254	20	31							
	SB	44	3	34	81	36.6	E	8.8	A	12.1	B	24.7	C								324	42	120							
	EB	75	342	7	424	10.5	B	9.4	A	4.8	A	9.5	A								899	66	220							
	WB	8	192	91	291	4.3	A	2.8	A	2.0	A	2.6	A								424	20	54							
Bloom Ave at 5th St	NB	7	108	53	168	5.5	A	6.2	A	3.7	A	5.3	A	5.3	A						324	41	75							
	SB	3	48	17	68	5.5	A	6.2	A	3.1	A	5.3	A								655	29	60							
	EB	37	60	21	118	5.2	A	6.0	A	3.2	A	5.3	A								902	36	66							
	WB	13	10	1	24	4.6	A	6.0	A	3.9	A	5.1	A								599	20	35							
Bald Eagle Ave at 4th St	NB	7	99	60	166	6.2	A	9.1	A	5.5	A	7.6	A	9.5	A						709	46	80							
	SB	208	96	39	343	9.5	A	10.1	B	7.5	A	9.4	A								338	71	148							
	EB	95	157	28	280	10.4	B	10.5	B	7.1	A	10.1	B								730	65	127							
	WB	40	116	74	230																									

Table B2b-2
White Bear Lake High School Expansion Study
2024 Build Conditions (7:30 AM High School Start Time, 8:00 AM Middle School Start Time)
School Dismissal Peak Hour (2:15 PM)

School Dismissal Peak Hour (2:15 PM)															Vehicle Queuing Information (feet)															
Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Left Turn Lane				Through Lane (s)					Right Turn Lane					
		L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Thru ⁽²⁾ ----->	% Block Left ⁽²⁾ <-----	Link Length (feet)	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Right ⁽²⁾ ----->	% Block Thru ⁽²⁾ <-----	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹		
Hwy 61 at 4th St (Signal)	NB	213	1307	116	1,636	61.5	E	11.9	B	4.1	A	18.2	B	20.9	C	190	149	306		2 %	1374	157	413	3 %			170	20	129	
	SB	20	881	67	968	68.8	E	15.2	B	14.1	B	16.1	B			250	20	54				325	112	249						
	EB	112	50	174	336	62.8	E	40.3	D	5.4	A	29.1	C			100	79	133		11 %	424	60	295	11 %	2 %	50	33	99		
	WB	109	72	12	193	58.0	E	46.3	D	29.7	C	52.0	D			100	85	170		4 %	1199	76	203							
Hwy 61 at 7th St (Signal)	NB	72	1315	38	1,425	15.8	B	3.0	A	1.2	A	3.6	A	6.0	A	300	22	96			657	31	156							
	SB		837	51	888			3.3	A	1.4	A	3.2	A									264	20	100						
	EB	59	23	131	213	51.4	D	48.3	D	11.7	B	26.7	C									507	62	142			235	49	143	
	WB	21	10	9	40	50.6	D	45.9	D	24.2	C	41.8	D									1489	26	80			120	20	59	
Hwy 61 at 8th St (Signal) (Planned Signal)	NB	98	1262	19	1,379	62.7	E	6.2	A	1.5	A	10.1	B	11.8	B	230	71	157			264	83	216	2 %			130	20	20	
	SB	32	788	96	916	55.6	E	9.7	A	3.3	A	10.5	B			375	22	72				1040	88	257			325	20	46	
	EB	122	5	93	220	38.4	D	16.8	B	8.7	A	25.1	C									55	65	88			30	37	74	
	WB	8	8	10	26	43.6	D	50.9	D	12.5	B	35.4	D									1363	20	68			75	20	30	
Hwy 61 at Hwy 96 (Signal)	NB		989	259	1,248			6.2	A	2.7	A	5.5	A	12.0	B						282	77	195			170	20	76		
	SB	46	684		730	62.4	E	10.6	B			13.5	B			250	39	108				4312	56	170						
	EB											0.0	A																	
	WB	183		28	211	52.9	D			3.1	A	44.8	D									1745	130	240						
Hwy 61 at Buffalo St (Signal)	NB	42	920	53	1,015	81.7	F	26.9	C	9.7	A	28.1	C	26.3	C	250	26	183		3 %	4312	156	380	1 %			225	20	20	
	SB	47	649	122	818	65.4	E	12.2	B	2.0	A	13.7	B			240	21	71				750	80	177			175	20	34	
	EB	197	29	38	264	64.2	E	56.4	E	8.1	A	55.5	E									113	155	202			55	20	56	
	WB	45	41	47	133	47.5	D	47.7	D	12.4	B	35.2	D									1342	69	189	9 %	1 %	80	28	122	
Long Ave at 8th St	NB											0.0	A	4.6	A															
	SB	20		9	29	15.1	C			3.7	A	11.4	B									427	20	44						
	EB	7	204		211	7.4	A	7.5	A			7.5	A									208	30	126	10 %					
	WB		165	37	202			0.8	A	0.5	A	0.7	A									55	20	20						
Washington Ave at 8th St	NB	17		2	19	6.2	A			5.4	A	6.1	A	1.5	A						270	20	51							
	SB											0.0	A																	
	EB		207	9	216			1.6	A	1.7	A	1.6	A																	
	WB	5	169		174	3.5	A	0.7	A			0.8	A																	
Division Ave at 7th St	NB		11	11	22			5.6	A	3.0	A	4.2	A	5.9	A						589	20	45							
	SB	142	22	4	168	6.9	A	7.7	A	8.9	A	7.0	A									290	37	79						
	EB	3	62	2	67	5.4	A	6.3	A	3.0	A	6.1	A									811	32	72						
	WB	14	44	73	131	5.6	A	6.4	A	3.7	A	4.8	A									507	41	79						
Division Ave at 8th St (All-way Stop)	NB	4	78	5	87	6.1	A	7.0	A	4.7	A	6.9	A	8.0	A						290	34	67							
	SB	129	154	100	383	9.3	A	9.9	A	6.7	A	8.9	A									873	70	172						
	EB	89	83		172	7.8	A	7.9	A			7.9	A									589	46	110						
	WB	14	72	101	187	6.9	A	8.8	A	5.2	A	6.8	A									252	56	112						
Division Ave at New HS Access	NB		269		269			1.6	A			1.6	A	3.4	A															
	SB		275		275			1.9	A			1.9	A																	
	EB	42		107	149	12.5	B			8.2	A	9.3	A									537	45	145						
	WB											0.0	A																	
Divison St at Pick Up/Drop Off Access	NB	103	208		311	0.2	A	0.2	A			0.2	A	3.8	A															
	SB		172	59	231			8.2	A	3.7	A	7.1	A									382	50	97				200	27	55
	EB	59		103	162	8.4	A			4.1	A	5.6	A				710	24	85								355	30	91	
	WB											0.0	A																	
Divison St at 12th St	NB		265	3	268			0.4	A	0.2	A	0.4	A	0.6	A															
	SB	1	225		226	2.4	A	0.6	A			0.6	A									1049		20						
	EB											0.0	A																	
	WB	5		3	8	6.6	A			3.2	A	5.5	A									727	20	35						
Bloom Ave at 4th St	NB	6	4	10	20	10.1	B	10.7	B	3.4	A	6.6	A	3.6	A						300	20	44							
	SB	60	8	41	109	12.2	B	11.5	B	7.4	A	10.3	B									324	38	78						
	EB	49	264	7	320	5.5	A	2.5	A	2.2	A	3.0	A									898	20	89						
	WB	8	310	28	346	3.8	A	2.0	A	1.7	A	2.0	A									424	20	49						
Bloom Ave at 5th St	NB	14	33	36	83	4.6	A	6.1	A	3.3	A	4.6	A	5.2	A						324	32	66							
	SB	4	68	21	93	4.9	A	6.4	A	3.4	A	5.7	A									655	35	70						
	EB	20	28	7	55	4.5	A	5.6	A	3.1	A	5.0	A									902	28	50						
	WB	37	32	1	70	4.8	A	6.4	A	2.7	A	5.5	A									5								

Table B2c-1
White Bear Lake High School Expansion Study
2028 Build Conditions (8:30 AM High School Start Time, 8:00 AM Middle School Start Time) - Westbound Right Turn Lane Added at Division Ave/8th St
AM Peak Hour (7:30 AM)

AM Peak Hour (7:30 AM)															Vehicle Queuing Information (feet)																
Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Left Turn Lane				Through Lane (s)					Right Turn Lane						
		L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Thru ⁽²⁾ <---->	% Block Left ⁽²⁾ <----	Link Length (feet)	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Right ⁽²⁾ <---->	% Block Thru ⁽²⁾ <----	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹			
Hwy 61 at 4th St (Signal)	NB	191	900	49	1,140	59.5	E	7.1	A	2.1	A	15.4	B	22.8	C	190	122	287			1374	89	318					170	20	20	
	SB	13	1799	92	1,904	13.6	B	20.6	C	18.6	B	20.5	C			250	20	20		18 %	329	277	353	18 %							
	EB	76	47	247	370	89.9		67.1	E	24.4	C	43.4	D			100	78	134		23 %	424	176	410	23 %	21 %	50	84	100			
	WB	67	33	4	104	83.7	F	58.8	E	35.6	D	73.3	E			100	62	132		2 %	1201	35	125								
Hwy 61 at 7th St (Signal)	NB	193	755	15	963	87.5	F		3.1	A	0.8	A	19.1	B	19.7	B	300	177	426			654	55	498							
	SB		1737	83	1,820			14.6	B	11.3	B	14.4	B								272	203	297								
	EB	54	12	174	240	85.9	F	76.0	E	43.1	D	54.5	D								506	62	154				235	111	207		
	WB	26	29	7	62	70.4	E	68.0	E	9.6	A	60.1	E								1490	54	124	1 %		120	20	59			
Hwy 61 at 8th St (Signal) (Planned Signal)	NB	156	648	14	818	71.2	E	5.8	A	1.1	A	17.9	B	51.5	D	230	118	259			272	51	261				130		20		
	SB	30	1620	216	1,866	35.2	D	72.6	E	45.0	D	68.9	E			375	78	549		26 %	1018	653	1034	31 %		325	212	365			
	EB	80	4	194	278	48.6	D	44.4	D	25.9	C	32.6	C								39	49	73			20	67	81			
	WB	5	8	7	20	54.4	D	54.6	D	6.2	A	36.1	D								1363	20	60			75	20	31			
Hwy 61 at Hwy 96 (Signal)	NB		459	159	618			11.5	B	2.2	A	9.2	A	42.3	D						291	69	172								
	SB	60	1412		1,472	111.1	F	47.8	D			50.3	D			250	90	274		15 %	4312	302	843								
	EB											0.0	A																		
	WB	358		15	373	66.6	E			12.4	B	64.4	E								1745	331	587				230	20	204		
Hwy 61 at Buffalo St (Signal)	NB	18	434	20	472	102.3	F	29.3	C	7.7	A	30.5	C	24.4	C	250	20	51			4312	122	246			225		20			
	SB	42	1310	354	1,706	73.6	E	16.4	B	4.9	A	15.4	B			240	25	195		4 %	750	182	498	6 %		175	38	260			
	EB	122	34	53	209	65.0	E	56.5	E	24.1	C	53.0	D								113	129	192			55	36	106			
	WB	108	59	55	222	68.8	E	65.5	E	8.9	A	52.6	D								1342	146	318	39 %		80	41	205			
Long Ave at 8th St	NB											0.0	A	7.2	A																
	SB	28		11	39	34.3	D			11.6	B	27.6	D								423	22	83								
	EB	15	247		262	8.9	A	14.4	B			14.1	B							17 %	208	75	216	17 %							
	WB		356	25	381			0.6	A	0.4	A	0.6	A								39	20	35								
Washington Ave at 8th St	NB	3		2	5	11.2	B			5.3	A	9.2	A	1.3	A						270	20	30								
	SB	1			1	5.1	A					5.1	A								353	20	20								
	EB		257	1	258			2.0	A	1.5	A	2.0	A								252	20	54								
	WB	2	362	1	365	3.8	A	0.8	A	0.0	A	0.8	A								208	20	29								
Division Ave at 7th St	NB	1	13	18	32	3.9	A	6.0	A	3.3	A	4.4	A	8.7	A						589	20	65								
	SB	162	12	5	179	6.9	A	7.0	A	7.4	A	6.9	A								290	37	63								
	EB	4	62	1	67	5.9	A	6.3	A	0.0	A	6.3	A								811	27	66								
	WB	8	102	192	302	11.0	B	10.7	B	10.9	B	10.8	B								506	101	211								
Division Ave at 8th St (All-way Stop)	NB	16	187	7	210	13.8	B	16.7	C	8.7	A	16.2	C	11.8	B						290	79	206								
	SB	128	165	133	426	12.2	B	12.1	B	8.8	A	11.0	B								410	81	214								
	EB	80	124	1	205	10.4	B	10.4	B	17.6	C	10.4	B								589	58	127								
	WB	15	135	216	366	7.3	A	10.3	B	11.7	B	11.0	B								252	58	194		2 %	150	71	172			
Division Ave at New HS Access	NB	205	279		484	7.3	A	1.7	A			3.8	A	3.1	A	200	38	108								2 %	150	71	172		
	SB		427	80	507			2.5	A	2.0	A	2.4	A								603	20	26								
	EB											0.0	A																		
	WB											0.0	A																		
Division St at Pick Up/Drop Off Access	NB	183	96		279	0.4	A	0.2	A			0.3	A	6.7	A	500		20									200	41	104		
	SB		289	107	396			11.8	B	6.5	A	10.4	B								382	74	129				200	41	104		
	EB	71		218	289	10.3	B			7.3	A	8.0	A			710	27	80								355	47	147			
	WB											0.0	A																		
Divison St at 12th St	NB		167	1	168			0.5	A	0.2	A	0.5	A	1.0	A																
	SB		390		390			1.1	A			1.1	A																		
	EB											0.0	A																		
	WB	5		2	7	6.2	A			2.2	A	4.9	A								727	20	31								
Bloom Ave at 4th St	NB	3	2	3	8	7.0	A	11.1	B	4.4	A	7.1	A	3.6	A						254	20	31								
	SB	44	3	30	77	12.6	B	3.5	A	6.6	A	9.5	A								324	33	77								
	EB	67	319	7	393	5.8	A	2.7	A	2.4	A	3.2	A								899	24	92								
	WB	12	202	103	317	4.5	A	2.7	A	1.8	A	2.5	A								424	20	58								
Bloom Ave at 5th St	NB	7	122	44	173	4.6	A	6.2	A	3.7	A	5.5	A	5.3	A						324	39	86								
	SB	2	50	19	71	2.4	A	6.1	A	3.1	A	5.2	A								655	29	66								
	EB	32	36	19	87	5.0	A	6.3	A	3.4	A	5.2	A								902	31	65								
	WB	12	12	2	26	4.5	A	6.3	A	2.8	A	5.1	A								5990										

Table B2c-2
White Bear Lake High School Expansion Study
2028 Build Conditions (8:30 AM High School Start Time, 8:00 AM Middle School Start Time) - Westbound Right Turn Lane Added at Division Ave/8th St
School Dismissal Peak Hour (2:45 PM)

School Dismissal Peak Hour (2:45 PM)														Vehicle Queuing Information (feet)															
Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Left Turn Lane				Through Lane (s)					Right Turn Lane				
		L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Thru ⁽²⁾ ----->	% Block Left ⁽²⁾ <-----	Link Length (feet)	Avg. Queue (feet) ¹	Max Queue (feet) ¹	% Block Right ⁽²⁾ ----->	% Block Thru ⁽²⁾ <-----	Storage (feet) ³	Avg. Queue (feet) ¹	Max Queue (feet) ¹	
Hwy 61 at 4th St (Signal)	NB	238	1529	130	1,897	65.0	E	15.5	B	6.0	A	21.1	C	23.1	C	190	175	309		5 %	1374	201	475	7 %			170	21	290
	SB	26	931	73	1,030	59.2	E	18.8	B	15.0	B	19.5	B			250	20	53		1 %	325	144	278	1 %					
	EB	113	67	186	366	61.6	E	41.5	D	5.7	A	29.4	C			100	83	134		22 %	424	79	303	22 %	2 %	50	44	100	
	WB	103	72	14	189	56.0	E	47.4	D	35.4	D	51.1	D			100	72	155		6 %	1199	71	180						
Hwy 61 at 7th St (Signal)	NB	95	1552	29	1,676	14.6	B	3.9	A	1.7	A	4.5	A	6.3	A	300	28	107				657	40	166			300		20
	SB		907	38	945			2.9	A	2.5	A	2.9	A									264	20	99					
	EB	58	20	137	215	55.1	E	43.2	D	11.9	B	25.9	C									507	54	157			235	50	152
	WB	21	13	15	49	51.8	D	53.1	D	24.4	C	44.9	D									1489	34	102			120	20	56
Hwy 61 at 8th St (Signal) (Planned Signal)	NB	113	1491	19	1,623	63.2	E	6.6	A	1.2	A	10.4	B	11.8	B	230	84	203			264	102	251	4 %			130		20
	SB	34	840	86	960	54.7	D	9.1	A	3.0	A	10.2	B			375	26	84			1040	82	180			325	20	38	
	EB	127	6	99	232	38.3	D	34.1	C	8.8	A	25.1	C								55	63	74			30	39	86	
	WB	8	9	8	25	45.6	D	53.6	D	19.6	B	40.8	D								1363	20	61	1 %			75	20	34
Hwy 61 at Hwy 96 (Signal)	NB		1093	309	1,402			7.7	A	3.4	A	6.8	A	12.1	B						282	109	252	2 %			170	20	154
	SB	54	726		780	58.5	E	8.4	A			11.7	B			250	46	125			4312	25	127						
	EB											0.0	A																
	WB	197		30	227	53.9	D			3.3	A	47.1	D			1745	141	279									230		51
Hwy 61 at Buffalo St (Signal)	NB	53	1003	68	1,124	84.1	F	18.4	B	10.2	B	20.5	C	22.9	C	250	29	96		1 %	4312	54	218	1 %			225		20
	SB	39	698	138	875	59.5	E	12.2	B	2.2	A	12.5	B			240	20	76			750	82	202			175	20	30	
	EB	225	46	37	308	68.2	E	72.4	E	9.8	A	61.4	E								113	167	205			55	20	59	
	WB	45	45	65	155	45.9	D	44.1	D	9.4	A	28.5	C								1342	59	129	6 %			80	30	88
Long Ave at 8th St	NB											0.0	A	4.7	A														
	SB	24		9	33	16.7	C			7.1	A	13.8	B								427	21	61						
	EB	11	207		218	7.5	A	6.9	A			6.9	A								208	30	154	9 %					
	WB		171	37	208			0.8	A	0.5	A	0.8	A								55		20						
Washington Ave at 8th St	NB	9			9	6.3	A					6.3	A	1.2	A						270	20	35						
	SB											0.0	A																
	EB		214	5	219			1.5	A	1.6	A	1.5	A								252		20						
	WB	3	175		178	2.2	A	0.6	A			0.6	A								208		20						
Division Ave at 7th St	NB		17	15	32			6.2	A	2.7	A	4.6	A	5.9	A						589	20	50						
	SB	142	22	4	168	6.8	A	7.5	A	9.0	A	6.9	A								290	37	67						
	EB	5	59	2	66	4.6	A	6.4	A	5.1	A	6.3	A								811	29	67						
	WB	14	31	102	147	5.7	A	7.0	A	4.2	A	4.9	A								507	41	79						
Division Ave at 8th St (All-way Stop)	NB	6	118	5	129	5.5	A	7.6	A	4.9	A	7.4	A	7.8	A						290	38	78						
	SB	135	155	64	354	9.1	A	9.3	A	5.8	A	8.6	A								410	59	162						
	EB	85	79		164	8.2	A	8.3	A			8.3	A								589	47	110						
	WB	14	46	126	186	6.5	A	8.1	A	5.4	A	6.2	A								252	33	81			150	46	116	
Division Ave at New HS Access	NB		326		326			1.6	A			1.6	A	2.6	A														
	SB		272		272			1.6	A			1.6	A																
	EB	33		84	117	10.0	B			6.5	A	7.5	A								537	40	115						
	WB											0.0	A																
Divison St at Pick Up/Drop Off Access	NB	152	207		359	0.5	A	0.3	A			0.4	A	3.8	A	500		20								200	35	80	
	SB		120	87	207			8.3	A	4.8	A	6.9	A								382	40	75				200	35	80
	EB	87		152	239	10.0	B			4.0	A	6.2	A			710	30	90								355	31	75	
	WB											0.0	A																
Divison St at 12th St	NB		290	5	295			0.5	A	0.3	A	0.5	A	0.5	A														
	SB	1	201		202	0.9	A	0.5	A			0.5	A																
	EB											0.0	A																
	WB	3		1	4	5.1	A			1.4	A	4.2	A								727	20	31						
Bloom Ave at 4th St	NB	6	4	8	18	9.7	A	15.6	C	4.6	A	8.0	A	3.6	A						300	20	40						
	SB	50	8	36	94	13.4	B	7.6	A	7.2	A	10.5	B								324	37	81						
	EB	46	303	11	360	5.6	A	2.6	A	2.1	A	2.9	A								898	20	99						
	WB	8	347	28	383	4.6	A	2.3	A	1.7	A	2.3	A								424	20	79						
Bloom Ave at 5th St	NB	16	26	40	82	4.3	A	6.0	A	3.3	A	4.3	A	5.2	A						324	30	62						
	SB	4	61	22	87	4.2	A	6.2	A	3.3	A	5.3	A								655	32	55						
	EB	14	30	7	51	4.8	A	6.2	A	3.0	A	5.4	A								902	27	55						
	WB	26	54	1	81	4.8	A	6.3	A	0.0	A	5.8	A								599	34	65						
Bald Eagle Ave at 4th St	NB	23	54	58	135	6.4	A	7.9	A	4.1	A	5.9	A	8.5	A						709	38	74						
	SB	124	53	76	253	6.9	A	8.0	A	5.4	A	6.6	A								338	51	109						
	EB	47	174	6	227	7.6	A	8.2	A	5.2	A	8.0	A								730	53	99						
	WB	55	174	160	389	10.8	B	12.4	B	9.5	A	11.0	B								898	102	178						
Bald Eagle Ave at 5th St	NB		247	12	259																								

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB DIVISION	0	0	12.00	1	14.00	1	50.00	50.00	30.00
2	WB 7th	90	0	12.00	1	14.00	1	50.00	50.00	30.00
3	SB DIVISION	180	0	12.00	1	14.00	1	50.00	50.00	30.00
4	EB 7th	270	0	12.00	1	14.00	1	50.00	50.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB DIVISION	80.00	19.00	1	14.00	1	12.00	1
2	WB 7th	80.00	19.00	1	14.00	1	12.00	1
3	SB DIVISION	80.00	19.00	1	14.00	1	12.00	1
4	EB 7th	80.00	19.00	1	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB DIVISION	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB 7th	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0
3	SB DIVISION	0	1.000	0	1.000	36.00	1792	0	12.00	1792	0
4	EB 7th	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)				Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow		Average VCR	
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass
1	NB DIVISION	None	32		228		21		853	0.0375
2	WB 7th	None	302		18		242		968	0.3121
3	SB DIVISION	None	179		111		209		917	0.1953
4	EB 7th	None	67		182		108		878	0.0763

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB DIVISION	None	4.24		4.24	0.18		A		A
2	WB 7th	None	5.12		5.12	1.50		A		A
3	SB DIVISION	None	4.70		4.70	1.02		A		A
4	EB 7th	None	4.30		4.30	0.39		A		A

2040 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB DIVISION	None	52		348		29	787		0.0656	
2	WB 7th	None	364		29		370	961		0.3785	
3	SB DIVISION	None	263		134		259	904		0.2912	
4	EB 7th	None	112		265		132	832		0.1342	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB DIVISION	None	4.03		4.03	0.18		A		A
2	WB 7th	None	5.21		5.21	1.50		A		A
3	SB DIVISION	None	4.63		4.63	1.02		A		A
4	EB 7th	None	4.07		4.07	0.39		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	580		580
Capacity	veh/hr	3615		3615
Average Delay	sec/veh	4.85		4.85
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.78		0.78

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB DIVISION	0	0	12.00	1	14.00	1	50.00	50.00	30.00
2	WB 8th	90	0	12.00	1	14.00	1	50.00	50.00	30.00
3	SB DIVISION	180	0	12.00	1	14.00	1	50.00	50.00	30.00
4	EB 8th	270	0	12.00	1	14.00	1	50.00	50.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB DIVISION	80.00	19.00	1	14.00	1	12.00	1
2	WB 8th	80.00	19.00	1	14.00	1	12.00	1
3	SB DIVISION	80.00	19.00	1	14.00	1	12.00	1
4	EB 8th	80.00	19.00	1	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB DIVISION	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB 8th	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0
3	SB DIVISION	0	1.000	0	1.000	36.00	1792	0	12.00	1792	0
4	EB 8th	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)				Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow		Average VCR	
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass
1	NB DIVISION	None	210		332		181		796	0.2639
2	WB 8th	None	366		283		259		823	0.4449
3	SB DIVISION	None	426		166		483		887	0.4805
4	EB 8th	None	205		308		284		809	0.2534

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB DIVISION	None	6.27		6.27	1.83		A		A
2	WB 8th	None	7.56		7.56	2.84		A		A
3	SB DIVISION	None	7.34		7.34	3.06		A		A
4	EB 8th	None	6.13		6.13	1.93		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1207		1207
Capacity	veh/hr	3314		3314
Average Delay	sec/veh	7.01		7.01
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	2.35		2.35

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB DIVISION	0	0	12.00	1	14.00	1	50.00	50.00	30.00
2	WB 7th	90	0	12.00	1	14.00	1	50.00	50.00	30.00
3	SB DIVISION	180	0	12.00	1	14.00	1	50.00	50.00	30.00
4	EB 7th	270	0	12.00	1	14.00	1	50.00	50.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB DIVISION	80.00	19.00	1	14.00	1	12.00	1
2	WB 7th	80.00	19.00	1	14.00	1	12.00	1
3	SB DIVISION	80.00	19.00	1	14.00	1	12.00	1
4	EB 7th	80.00	19.00	1	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB DIVISION	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB 7th	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0
3	SB DIVISION	0	1.000	0	1.000	36.00	1792	0	12.00	1792	0
4	EB 7th	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)				Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow		Average VCR	
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass
1	NB DIVISION	None	32		206		38		830	0.0386
2	WB 7th	None	147		22		216		929	0.1583
3	SB DIVISION	None	168		45		124		916	0.1833
4	EB 7th	None	66		178		35		845	0.0781

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB DIVISION	None	4.26		4.26	0.14		A		A
2	WB 7th	None	4.28		4.28	0.63		A		A
3	SB DIVISION	None	4.61		4.61	1.10		A		A
4	EB 7th	None	4.40		4.40	0.38		A		A

2040 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB DIVISION	None	40		342		58	757		0.0528	
2	WB 7th	None	188		29		352	925		0.2038	
3	SB DIVISION	None	285		58		160	910		0.3130	
4	EB 7th	None	105		295		46	782		0.1340	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB DIVISION	None	4.30		4.30	0.14		A		A
2	WB 7th	None	4.17		4.17	0.63		A		A
3	SB DIVISION	None	4.46		4.46	1.10		A		A
4	EB 7th	None	4.26		4.26	0.38		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	413		413
Capacity	veh/hr	3520		3520
Average Delay	sec/veh	4.43		4.43
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.51		0.51

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB DIVISION	0	0	12.00	1	14.00	1	50.00	50.00	30.00
2	WB 8th	90	0	12.00	1	14.00	1	50.00	50.00	30.00
3	SB DIVISION	180	0	12.00	1	14.00	1	50.00	50.00	30.00
4	EB 8th	270	0	12.00	1	14.00	1	50.00	50.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB DIVISION	80.00	19.00	1	14.00	1	12.00	1
2	WB 8th	80.00	19.00	1	14.00	1	12.00	1
3	SB DIVISION	80.00	19.00	1	14.00	1	12.00	1
4	EB 8th	80.00	19.00	1	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB DIVISION	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB 8th	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0
3	SB DIVISION	0	1.000	0	1.000	36.00	1792	0	12.00	1792	0
4	EB 8th	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)				Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow		Average VCR	
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass
1	NB DIVISION	None	129		298		169		780	0.1653
2	WB 8th	None	186		209		218		829	0.2245
3	SB DIVISION	None	354		66		329		905	0.3911
4	EB 8th	None	164		303		116		778	0.2109

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB DIVISION	None	5.49		5.49	0.95		A		A
2	WB 8th	None	5.29		5.29	1.07		A		A
3	SB DIVISION	None	7.30		7.30	4.49		A		A
4	EB 8th	None	7.10		7.10	2.33		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	833		833
Capacity	veh/hr	3292		3292
Average Delay	sec/veh	6.53		6.53
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	1.51		1.51

TURNING MOVEMENT COUNT DATA

All Vehicles

Start Time	TH 61				4th St				TH 61				4th St				Int. Total
	Southbound				Westbound				Northbound				Eastbound				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
6:00	0	161	11	0	8	0	0	0	14	42	4	0	8	0	13	0	261
6:15	0	281	11	0	2	3	0	0	9	62	2	0	5	2	26	0	403
6:30	1	354	13	0	8	3	0	0	19	125	5	1	9	3	21	0	561
6:45	1	355	21	1	5	4	0	0	23	122	14	0	15	2	22	0	584
7:00	4	400	22	0	9	7	1	0	29	106	4	1	20	7	43	0	652
7:15	0	460	33	0	11	13	0	0	39	167	8	0	20	9	73	0	833
7:30	1	457	29	0	23	5	0	0	24	99	6	0	24	9	64	0	741
7:45	6	385	47	0	15	15	2	0	37	113	9	0	16	10	42	0	697
8:00	3	251	21	2	10	10	1	0	44	145	10	0	13	12	52	0	572
8:15	5	270	13	0	21	15	2	0	30	119	15	1	16	24	29	0	559
8:30	6	201	18	0	19	9	1	0	30	115	17	0	27	13	26	0	482
8:45	2	263	34	0	16	13	2	0	39	132	21	0	25	17	44	0	608
9:00	4	198	22	0	14	7	0	0	40	138	20	1	39	15	48	0	545
9:15	6	212	20	0	17	11	4	0	40	157	16	0	17	14	41	0	555
9:30	9	186	14	0	19	11	4	0	32	144	26	0	18	13	21	0	497
9:45	2	150	20	1	15	10	3	1	49	143	17	0	13	13	32	0	467
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	4	159	7	0	30	13	2	0	26	165	21	0	16	9	29	0	481
10:45	6	155	11	5	27	12	2	0	35	153	32	2	22	12	32	0	499
11:00	4	161	15	0	23	8	3	0	36	169	27	2	23	11	33	0	513
11:15	3	160	9	2	30	15	3	0	40	154	30	0	21	13	35	0	513
11:30	8	175	15	1	26	13	6	0	37	190	33	0	22	15	38	0	578
11:45	7	168	16	0	27	14	11	0	25	191	28	0	15	13	36	0	551
12:00	9	175	22	1	28	19	6	0	39	181	33	0	20	10	28	0	570
12:15	4	144	21	1	33	13	0	0	43	181	25	0	27	17	30	0	538
12:30	6	174	15	1	22	20	2	0	31	229	26	1	26	12	40	0	603
12:45	3	162	19	0	24	21	6	0	43	233	21	2	15	21	27	0	595
13:00	4	138	12	0	25	10	3	0	31	221	36	1	24	9	43	0	556
13:15	5	126	10	2	27	17	6	0	37	202	32	0	29	17	37	0	545
13:30	7	163	16	0	28	11	4	0	27	213	18	0	24	12	36	0	559
13:45	6	135	16	1	35	18	2	0	53	248	18	3	19	12	26	0	588
14:00	1	164	17	2	25	14	2	0	33	208	24	0	24	6	42	0	560
14:15	6	184	15	1	25	19	4	0	47	224	19	1	29	16	39	0	627
14:30	4	146	11	0	26	22	0	0	48	242	27	2	31	11	36	0	604
14:45	4	141	21	1	29	19	5	0	84	325	30	2	34	19	30	0	741
15:00	3	184	15	3	25	16	5	0	67	345	28	0	35	14	63	0	800
15:15	11	180	23	2	26	17	3	0	67	294	25	6	29	23	46	1	744
15:30	6	157	21	0	23	24	6	0	72	312	27	0	33	19	34	0	734
15:45	11	182	24	0	20	20	3	0	68	360	51	0	40	36	54	0	869
16:00	7	151	22	0	24	18	1	0	52	336	58	12	35	24	34	3	762
16:15	7	156	24	5	22	14	3	0	58	342	63	11	30	31	40	0	790
16:30	7	183	19	0	22	25	2	0	58	369	50	0	35	31	29	0	830
16:45	12	211	36	1	16	24	5	0	57	397	47	3	38	31	37	0	911
17:00	8	204	24	3	27	27	3	0	84	313	38	10	27	18	46	0	819
17:15	13	171	26	0	18	20	7	0	67	380	43	5	34	15	46	0	840
17:30	10	197	23	0	33	60	5	0	62	283	28	2	33	23	42	0	799
17:45	6	184	20	0	21	19	4	0	52	317	33	8	21	18	40	1	735
18:00	7	147	15	5	33	25	5	0	73	269	27	7	27	12	45	0	685
18:15	6	147	21	2	25	16	3	0	54	265	38	2	31	13	41	0	660
18:30	8	117	17	3	15	14	4	0	47	190	20	9	23	14	44	0	513
18:45	5	105	22	4	17	13	4	0	52	191	30	6	14	7	36	2	496
19:00	3	95	10	9	14	8	2	0	35	187	14	5	17	9	29	0	423
19:15	2	88	11	7	22	17	8	0	29	178	8	6	29	11	25	0	428
19:30	5	97	14	1	19	10	5	0	26	152	9	3	26	6	34	0	403
19:45	3	72	7	5	26	11	7	0	36	165	5	9	13	2	32	0	379
20:00	1	87	9	3	20	15	4	0	40	121	5	2	30	7	29	0	368
20:15	0	77	4	0	13	16	3	0	22	141	7	0	15	4	12	2	314
20:30	1	82	8	5	17	10	3	0	22	141	6	0	18	9	26	2	343
20:45	2	50	7	3	6	13	3	0	26	123	5	0	15	3	14	0	267
21:00	1	64	5	0	10	9	3	0	19	119	2	0	9	3	13	0	257
21:15	0	66	7	1	8	5	1	0	17	111	6	1	9	4	11	0	245
21:30	0	36	2	0	5	8	1	0	14	73	1	1	8	0	13	0	161
21:45	2	38	2	0	7	3	1	0	11	83	3	0	8	3	15	0	176
22:00	0	42	1	1	3	4	1	0	12	59	2	6	9	0	10	2	143
22:15	1	31	4	1	1	3	1	0	10	70	1	0	4	1	6	0	133
22:30	0	28	0	3	4	3	0	0	14	51	0	0	2	2	7	0	111
22:45	0	24	3	0	4	4	0	0	8	51	1	0	3	1	4	0	103
Total	289	11067	1063	89	1248	905	193	1	2544	12446	1355	134	1406	792	2171	13	35479
Cars+	286	10683	1042	89	1227	899	191	0	2504	12026	1344	133	1379	784	2122	12	34487
Trucks	3	384	21	0	21	6	2	1	40	420	11	1	27	8	49	1	992
% Trucks	1.0	3.5	2.0	0.0	1.7	0.7	1.0	100.0	1.6	3.4	0.8	0.7	1.9	1.0	2.3	7.7	
	3.3				1.2				2.9				1.9				2.8



TURNING MOVEMENT COUNT DATA
All Vehicles

	TH 61				7th St				TH 61				7th St				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
6:00	0	164	0	0	1	0	1	0	0	44	2	0	0	1	7	0	220
6:15	2	299	0	0	3	0	0	0	1	61	3	0	2	2	6	1	379
6:30	1	356	1	0	4	3	4	0	7	134	2	0	1	2	17	0	532
6:45	1	363	1	0	2	5	0	0	2	117	5	0	4	1	19	0	520
7:00	2	398	1	0	7	1	0	0	8	111	2	0	5	1	33	0	569
7:15	4	442	5	0	8	3	2	0	25	159	3	0	10	6	56	0	723
7:30	2	451	3	0	6	3	2	0	8	104	7	0	7	4	22	0	619
7:45	5	413	14	0	10	2	3	0	9	112	5	0	10	5	32	0	620
8:00	5	267	6	0	5	2	1	0	7	139	3	0	20	3	26	0	484
8:15	4	265	5	0	5	2	2	0	6	128	2	0	3	3	15	0	440
8:30	3	240	6	0	3	1	1	0	5	131	3	0	9	1	16	0	419
8:45	3	258	5	0	6	2	3	0	3	140	6	0	1	2	18	1	447
9:00	8	237	5	0	5	1	2	0	4	162	6	0	3	2	8	0	443
9:15	6	203	3	0	2	1	2	0	7	151	8	0	6	3	14	0	406
9:30	7	207	6	0	1	1	1	0	5	144	6	0	5	3	14	0	400
9:45	4	163	2	0	3	0	5	1	10	143	3	0	1	4	10	0	348
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	11	151	2	0	4	0	1	1	5	153	5	0	7	3	12	0	354
10:45	4	154	4	0	3	3	1	1	7	152	7	3	2	2	15	2	354
11:00	4	167	2	0	3	4	3	0	7	177	9	0	3	1	10	0	390
11:15	3	174	5	1	6	1	1	0	6	154	6	0	5	1	16	1	378
11:30	5	190	5	0	7	0	3	0	9	184	10	0	5	2	10	0	430
11:45	5	183	4	0	9	0	2	0	4	179	14	0	6	1	10	0	417
12:00	5	202	2	0	6	2	6	0	8	192	8	0	6	3	16	0	456
12:15	2	145	3	0	4	1	1	0	7	177	9	0	2	4	13	0	368
12:30	6	190	0	1	7	2	2	1	4	224	17	0	7	3	11	0	473
12:45	2	176	2	0	4	2	2	0	14	210	7	0	13	4	15	0	451
13:00	6	144	2	0	5	3	3	0	11	217	11	0	11	5	8	0	426
13:15	5	130	2	0	5	1	3	0	6	223	3	0	3	1	11	0	393
13:30	3	174	2	0	7	5	0	0	9	220	7	0	7	2	13	0	449
13:45	7	148	0	0	5	7	3	0	8	254	6	0	6	2	13	0	459
14:00	7	159	3	0	4	1	1	0	11	213	12	0	9	1	18	0	439
14:15	6	170	4	0	4	3	1	0	11	216	10	1	10	9	35	0	479
14:30	9	146	2	1	6	1	2	0	17	242	7	0	9	4	13	0	458
14:45	3	161	7	2	6	5	2	0	23	331	8	0	9	2	7	0	564
15:00	6	186	6	5	5	1	2	2	29	353	8	0	25	5	37	0	663
15:15	7	191	1	0	3	4	5	0	9	344	6	0	12	3	17	0	602
15:30	6	167	3	0	7	5	3	0	11	338	6	0	8	1	15	0	570
15:45	8	205	1	1	8	1	5	0	11	371	7	1	17	8	12	0	654
16:00	6	179	4	0	9	3	9	0	12	368	9	1	18	4	6	0	627
16:15	4	173	0	1	4	3	1	0	11	352	6	0	12	9	14	0	589
16:30	9	216	2	1	8	8	2	0	13	375	12	1	9	6	19	0	679
16:45	6	245	10	0	7	6	7	0	7	420	11	1	27	2	18	0	766
17:00	7	222	5	0	10	3	8	1	16	355	6	0	27	5	22	0	686
17:15	3	191	5	0	6	3	5	0	14	400	13	0	10	5	14	0	669
17:30	8	224	6	0	9	3	7	0	9	366	10	0	15	3	18	0	678
17:45	10	175	7	0	9	3	7	0	11	342	6	0	20	6	21	0	617
18:00	7	154	2	0	6	2	2	1	6	300	8	0	5	3	13	0	508
18:15	7	160	5	0	8	2	5	0	13	298	4	0	4	2	10	0	518
18:30	8	130	3	0	6	2	9	1	10	209	7	1	9	4	8	0	405
18:45	3	115	1	0	4	0	1	0	10	208	9	0	2	1	7	0	361
19:00	3	81	4	0	3	0	4	0	2	191	5	0	1	0	7	0	301
19:15	0	80	0	0	4	4	2	0	2	220	4	0	6	1	19	0	342
19:30	1	90	3	0	1	0	4	0	7	185	2	0	11	1	20	0	325
19:45	2	69	3	0	3	2	2	0	8	180	6	3	10	3	8	0	296
20:00	2	86	0	0	2	0	0	0	2	175	5	0	12	1	5	0	290
20:15	0	75	2	0	3	1	2	0	9	158	5	0	7	0	5	0	267
20:30	0	77	1	0	4	2	3	0	7	156	2	0	12	1	9	0	274
20:45	0	48	0	0	1	4	1	0	1	153	1	0	2	0	9	0	220
21:00	2	53	0	0	1	1	0	0	3	124	6	0	7	1	14	0	212
21:15	5	60	3	0	2	0	1	0	5	128	2	0	6	0	9	0	221
21:30	2	35	0	0	2	0	0	0	2	84	5	0	2	0	5	0	137
21:45	0	38	0	0	0	1	1	0	0	89	2	1	4	0	4	0	139
22:00	0	40	1	0	0	0	0	0	1	68	3	0	3	2	1	0	119
22:15	0	32	0	0	0	2	1	0	2	75	3	0	2	0	3	0	120
22:30	1	28	0	0	0	0	0	0	1	52	3	0	2	1	2	0	90
22:45	0	24	0	0	0	0	0	0	2	50	0	0	2	0	3	0	81
Total	273	11539	192	13	301	134	165	9	520	13185	404	13	516	171	933	5	28333
Cars+	268	11171	190	12	287	130	162	5	485	12804	397	12	501	167	880	5	27442
Trucks	5	368	2	1	14	4	3	4	35	381	7	1	15	4	53	0	891
% Trucks	1.8	3.2	1.0	7.7	4.7	3.0	1.8	44.4	6.7	2.9	1.7	7.7	2.9	2.3	5.7	0.0	
	3.1				3.5				3.0				4.4				3.1



TURNING MOVEMENT COUNT DATA
 All Vehicles

Start Time	TH 61				TH 96				TH 61				N/A				Int. Total	
	Southbound				Westbound				Northbound				Eastbound					
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds		
6:00	7	132	0	0	25	0	2	0	0	38	5	0	0	0	0	0	0	209
6:15	6	232	0	0	50	0	0	0	0	37	11	0	0	0	0	0	0	336
6:30	7	265	0	0	67	0	4	0	0	78	17	0	0	0	0	0	0	438
6:45	15	295	0	0	74	0	3	0	0	83	16	0	0	0	0	0	0	486
7:00	11	327	0	0	61	0	2	0	0	57	32	0	0	0	0	0	0	490
7:15	19	329	0	0	102	0	5	0	0	71	43	0	0	0	0	0	0	569
7:30	23	351	0	0	101	0	0	0	0	59	38	0	0	0	0	0	0	572
7:45	13	346	0	0	112	0	3	0	0	74	28	0	0	0	0	0	0	576
8:00	7	228	0	0	70	0	4	0	0	111	29	0	0	0	0	0	0	449
8:15	13	194	0	0	74	0	6	0	0	80	42	0	0	0	0	0	0	409
8:30	11	178	0	0	72	0	5	0	0	84	40	0	0	0	0	0	0	390
8:45	14	190	0	0	75	0	4	0	0	83	44	0	0	0	0	0	0	410
9:00	8	177	0	0	59	0	9	0	0	89	40	0	0	0	0	0	0	382
9:15	7	139	0	0	65	0	8	0	0	97	46	0	0	0	0	0	0	362
9:30	9	142	0	0	54	0	5	0	0	81	42	0	0	0	0	0	0	333
9:45	7	135	0	0	51	0	7	0	0	72	36	0	0	0	0	0	0	308
10:00	6	117	0	0	55	0	6	0	0	101	39	0	0	0	0	0	0	324
10:15	15	125	0	0	50	0	7	0	0	77	31	0	0	0	0	0	0	305
10:30	9	123	0	0	37	0	10	0	0	89	40	0	0	0	0	0	0	308
10:45	7	115	0	0	40	0	9	0	0	106	37	0	0	0	0	0	0	314
11:00	10	131	0	0	37	0	6	0	0	103	46	0	0	0	0	0	0	333
11:15	9	124	0	0	51	0	6	0	0	94	43	0	0	0	0	0	0	327
11:30	10	145	0	0	49	0	8	0	0	111	56	0	0	0	0	0	0	379
11:45	4	134	0	0	57	0	5	0	0	109	52	0	0	0	0	0	0	361
12:00	9	132	0	0	51	0	1	0	0	123	60	0	0	0	0	0	0	376
12:15	5	85	0	0	55	0	5	0	0	106	46	0	0	0	0	0	0	302
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	5	110	0	0	25	0	7	0	0	135	66	0	0	0	0	0	0	348
13:15	10	90	0	0	45	0	6	0	0	123	59	0	0	0	0	0	0	333
13:30	5	125	0	0	49	0	11	0	0	150	57	0	0	0	0	0	0	397
13:45	12	105	0	0	46	0	8	0	0	158	58	0	0	0	0	0	0	387
14:00	13	135	0	0	37	0	6	0	0	142	39	0	0	0	0	0	0	372
14:15	10	118	0	0	33	0	4	0	0	154	49	0	0	0	0	0	0	368
14:30	8	102	0	0	46	0	11	0	0	177	48	0	0	0	0	0	0	392
14:45	9	117	0	0	48	0	5	0	0	206	71	1	0	0	0	0	0	456
15:00	14	145	0	0	52	0	11	0	0	241	79	1	0	0	0	0	0	542
15:15	18	145	0	0	51	0	8	0	0	208	75	0	0	0	0	0	0	505
15:30	14	133	0	0	39	0	4	0	0	234	78	1	0	0	0	0	0	502
15:45	9	159	0	0	45	0	8	0	0	259	93	1	0	0	0	0	0	573
16:00	19	146	0	0	41	0	7	0	0	268	81	0	0	0	0	0	0	562
16:15	15	122	0	0	53	0	5	0	0	227	93	0	0	0	0	0	0	515
16:30	17	159	0	0	58	0	6	0	0	244	87	0	0	0	0	0	0	571
16:45	19	192	0	0	68	0	6	0	0	311	91	0	0	0	0	0	0	687
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	9	121	0	0	38	0	4	0	0	201	72	0	0	0	0	0	0	445
18:15	6	122	0	0	50	0	1	0	0	173	66	0	0	0	0	0	0	418
18:30	4	97	0	0	38	0	4	0	0	149	53	0	0	0	0	0	0	345
18:45	3	82	0	0	31	0	5	0	0	124	53	0	0	0	0	0	0	298
19:00	5	74	0	0	17	0	6	0	0	155	40	0	0	0	0	0	0	297
19:15	5	57	0	0	19	0	3	0	0	136	61	0	0	0	0	0	0	281
19:30	2	59	0	0	24	0	11	0	0	136	53	0	0	0	0	0	0	285
19:45	2	57	0	0	22	0	7	0	0	121	41	0	0	0	0	0	0	250
20:00	2	47	0	0	39	0	5	0	0	129	50	0	0	0	0	0	0	272
20:15	4	39	0	0	37	0	5	0	0	118	44	0	0	0	0	0	0	247
20:30	2	30	0	0	30	0	1	0	0	127	35	0	0	0	0	0	0	225
20:45	1	26	0	0	16	0	5	0	0	104	40	0	0	0	0	0	0	192
21:00	0	32	0	0	15	0	3	0	0	93	41	0	0	0	0	0	0	184
21:15	3	39	0	0	22	0	3	0	0	82	34	0	0	0	0	0	0	183
21:30	1	27	0	0	7	0	2	0	0	73	17	0	0	0	0	0	0	127
21:45	2	21	0	0	12	0	5	0	0	61	28	0	0	0	0	0	0	129
22:00	0	21	0	0	4	0	3	0	0	48	16	0	0	0	0	0	0	92
22:15	1	21	0	0	1	0	3	1	0	57	16	0	0	0	0	0	0	99
22:30	0	18	0	0	5	0	1	0	0	41	13	0	0	0	0	0	0	78
22:45	3	15	0	0	6	0	4	0	0	37	15	0	0	0	0	0	0	80
Total	513	7999	0	0	2763	0	324	1	0	7615	2871	4	0	0	0	0	0	22085
Cars+	451	7753	0	0	2700	0	276	1	0	7378	2821	4	0	0	0	0	0	21379
Trucks	62	246	0	0	63	0	48	0	0	237	50	0	0	0	0	0	0	706
% Trucks	12.1	3.1	0.0	0.0	2.3	0.0	14.8	0.0	0.0	3.1	1.7	0.0	0.0	0.0	0.0	0.0	0.0	3.2
	3.6				3.6				2.7				0.0					



TURNING MOVEMENT COUNT DATA
All Vehicles

Start Time	TH 61				Buffalo St				TH 61				Buffalo St				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
6:00	3	155	4	0	9	2	5	0	1	28	2	0	2	0	8	0	219
6:15	4	216	8	0	21	4	9	0	1	43	1	0	8	0	6	0	321
6:30	6	287	16	0	19	6	10	0	4	71	0	0	5	7	13	0	444
6:45	19	284	20	0	30	16	14	0	3	87	1	0	8	5	13	0	500
7:00	6	270	24	0	39	33	15	0	1	50	5	0	9	13	19	0	484
7:15	7	332	31	0	31	22	15	0	4	79	2	0	15	9	10	0	557
7:30	12	336	8	0	33	21	16	0	7	56	2	0	13	15	22	0	541
7:45	9	288	15	0	34	15	17	0	1	68	5	0	6	7	18	0	483
8:00	12	217	15	0	18	10	15	0	3	106	8	0	16	6	10	0	436
8:15	8	179	7	0	16	4	11	0	7	78	4	0	11	3	4	0	332
8:30	14	176	4	0	15	11	8	0	11	71	7	0	4	7	5	0	333
8:45	9	196	16	0	15	15	7	0	2	71	7	0	6	5	13	0	362
9:00	10	161	11	0	12	9	6	0	4	88	6	0	10	6	9	0	332
9:15	10	132	8	0	11	5	8	0	4	89	9	0	6	7	13	0	302
9:30	3	113	6	1	18	4	6	0	8	63	7	1	4	7	8	0	247
9:45	13	132	3	0	5	4	4	0	2	71	11	0	6	3	11	0	265
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	8	119	5	0	11	3	7	0	7	89	7	0	6	5	8	0	275
10:45	5	96	4	0	15	0	10	0	4	99	6	0	10	9	8	0	266
11:00	6	114	7	0	16	5	9	0	5	100	8	0	9	2	4	0	285
11:15	11	120	7	0	15	5	10	0	6	87	9	0	7	4	9	0	290
11:30	4	124	3	0	14	4	8	0	12	108	9	0	6	5	10	0	307
11:45	4	121	3	0	3	3	5	0	2	107	8	0	8	6	7	0	277
12:00	10	128	9	0	10	5	3	0	4	108	9	0	10	5	11	0	312
12:15	8	101	5	0	11	3	11	0	3	78	6	0	5	4	6	0	241
12:30	7	120	5	0	4	5	5	0	9	122	8	0	8	8	9	0	310
12:45	9	110	6	0	10	4	8	0	9	134	8	0	6	5	10	0	319
13:00	3	95	7	0	8	6	4	0	10	110	10	0	5	4	13	0	275
13:15	8	89	4	0	6	5	12	0	7	117	11	0	12	1	11	0	283
13:30	7	105	6	0	6	4	10	0	11	133	9	0	7	5	7	0	310
13:45	6	110	4	0	4	6	7	0	8	147	9	0	9	5	11	0	326
14:00	10	121	21	0	15	6	4	0	13	139	6	0	10	7	9	0	361
14:15	9	108	6	0	10	12	7	0	6	145	11	0	20	9	8	0	351
14:30	20	103	8	0	6	5	9	0	6	164	11	0	12	12	8	0	364
14:45	6	100	11	0	11	16	17	0	9	190	16	0	8	5	12	0	401
15:00	10	153	14	0	11	10	23	0	12	216	16	0	18	8	6	0	497
15:15	6	126	8	0	14	9	20	0	19	190	16	0	18	16	7	0	449
15:30	9	138	10	0	8	6	16	0	13	200	16	0	19	8	9	0	452
15:45	10	153	5	0	10	11	12	0	9	239	23	0	14	18	13	0	517
16:00	9	156	12	0	6	14	11	0	16	256	23	0	10	21	10	0	544
16:15	10	124	8	0	5	5	17	0	10	200	21	0	14	18	11	0	443
16:30	11	165	10	0	20	17	22	0	12	224	21	0	18	14	10	0	544
16:45	8	180	15	0	16	10	10	0	12	272	25	0	15	15	14	0	592
17:00	10	166	7	0	13	9	17	0	12	230	19	0	16	18	11	0	528
17:15	16	133	6	0	12	6	14	0	14	227	28	0	10	21	8	0	495
17:30	7	158	7	0	18	11	19	0	16	217	21	0	12	19	12	0	517
17:45	14	121	13	0	10	10	14	0	16	198	16	0	5	13	15	0	445
18:00	14	114	5	0	8	4	7	0	11	173	15	0	9	8	6	0	374
18:15	4	111	17	0	9	9	13	0	14	149	17	0	7	5	5	0	360
18:30	7	82	5	0	9	8	4	0	12	115	14	0	8	10	6	0	280
18:45	6	75	11	0	8	7	10	0	6	114	12	0	11	5	8	0	273
19:00	8	58	7	0	9	3	9	0	15	133	16	0	8	3	5	0	274
19:15	8	55	5	0	3	2	15	0	10	111	14	0	5	5	4	0	237
19:30	11	45	2	0	11	5	1	0	8	129	9	0	11	6	1	0	239
19:45	7	40	3	0	8	2	2	0	11	108	15	0	3	5	3	0	207
20:00	7	45	4	0	1	0	3	0	7	122	10	0	3	4	0	0	206
20:15	1	35	3	0	3	5	3	0	9	99	11	0	3	6	1	0	179
20:30	3	24	3	0	4	6	7	0	8	110	9	0	5	3	3	0	185
20:45	4	21	5	0	2	3	5	0	9	89	10	0	2	2	4	0	156
21:00	1	30	5	0	3	3	6	0	6	82	7	0	17	4	0	0	164
21:15	2	31	0	0	1	3	4	0	6	68	12	0	2	4	4	0	137
21:30	2	20	2	0	2	5	4	0	5	58	4	0	5	8	2	0	117
21:45	4	15	0	0	4	1	4	0	3	60	3	0	5	0	2	0	101
22:00	4	18	1	0	2	9	5	0	6	41	6	0	3	2	2	0	99
22:15	1	19	2	0	2	0	2	0	5	49	5	0	1	1	4	0	91
22:30	3	12	2	0	0	3	4	0	2	33	5	0	2	1	1	0	68
22:45	2	14	0	0	6	1	3	0	2	38	3	0	1	1	0	0	71
Total	505	8095	514	1	739	475	618	0	510	7846	680	1	567	473	530	0	21552
Cars+	488	7728	471	0	734	466	592	0	499	7523	669	1	504	461	523	0	20658
Trucks	17	367	43	1	5	9	26	0	11	323	11	0	63	12	7	0	894
% Trucks	3.4	4.5	8.4	100.0	0.7	1.9	4.2	0.0	2.2	4.1	1.6	0.0	11.1	2.5	1.3	0.0	
	4.7				2.2				3.8				5.2				4.1



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We're confident in our ability to balance these requirements.

