Existing Conditions within the Study Area

Land Use & Zoning

A portion of McCarrolls East 5th Addition adjacent to Indian Trail Road is currently zoned as Residential Two Family (RTF). The remainder of the 5th Addition and the Remainder of McCarrolls East is listed as Residential Single Family. The subject property is located on a portion of Section 22, T26N R42E W.M., within the City of Spokane, Washington. The parcel numbers for the subject property are 26224.0129, 26224.0130, 26224.0127, 26225.0251, and 26221.0233. The surrounding area includes residential to the east, west, and north of the property with undeveloped land to the south of the development, zoned High Density Residential.

Existing Roadways

The overall transportation network in this area consists of urban principle arterials, collectors, and local access roads.

As shown on the site plan, the site is accessed via Indian Trail Road and Barnes Road. It is anticipated that the trips to/from the site will generally use the following roadways:

Indian Trail Road is generally a north-south two-way 2, 3 & 4-lane principle arterial that extends from Francis Avenue to Rutter Parkway. From Francis Avenue to Kathleen Avenue Indian Trail Road serves residential uses and a small commercial area with a 4-lane roadway. From Kathleen Avenue to Strong Road, Indian Trail Road serves residential uses with a three-lane roadway. From Strong Road to Barnes Road, Indian Trail Road serves commercial uses with a 4-lane roadway consisting of two southbound through lanes, a two-way-left-turn-lane, and a northbound through lane. From Barnes Road to Ridgecrest Drive Indian Trail Road serves residential uses with a 3-lane roadway. From Ridgecrest Drive to Rutter Parkway Indian Trail Road serves a mixture of residential and undeveloped land uses. The posted speed limit on Indian Trail Road is 30 MPH with the exception of a school zone located at the intersection of Indian Trail Road and Shawnee Drive where the speed limit is 20 MPH when children are present.

Barnes Road is an east-west two-way 2 & 3-lane minor arterial that extends from Madeline Court in the Ponderosa Ridge Development through Indian Trail Road and up the slope in the McCarrolls East Development. The City of Spokane Comprehensive Plan calls for the future connection of Barnes Road, to Nine Mile Road and Strong Road. Barnes Road serves a mixture of Commercial, Multi-Family and Single Family Residential uses. The posted speed limit on Barnes Road is 30 MPH

Strong Road is an east west two-way 2-lane minor arterial that extends east up the hill from Indian Trail Road onto the Five-Mile Plateau and continues east Through Five-Mile Road to Cedar Road. Strong Road generally serves residential land uses. The posted speed limit on strong road is 30 and 35 MPH.

Pacific Park Drive is an east-west two-way 2-lane collector that extends west from Indian Trail Road through the residential neighborhood to Forest Boulevard. Pacific Park Drive Serves primarily residential land uses. The Speed limit on Pacific Park Drive is 25 MPH.

Francis Avenue/ State Route 291 is an east-west, two-way 4- & 5-lane principal arterial that extends east from Nine Mile Road through Assembly Street, Indian Trail Road, A Street, Alberta Street, Ash Street, Maple Street, Monroe Street, Wall Street, Division Street, Addison Street, Nevada Street, Crestline Street, Market Street and Freya Street, as the arterial terminated at Bigelow Gulch Road. Within the study area Francis Serves a mixture of commercial and residential land uses. The speed limit on Francis Avenue is 3 0MPH.

Alberta Street is a north-south, one and two-way 2-lane arterial that extends south from Woodside Avenue through Francis Avenue and Wellesley Avenue to Driscoll Boulevard where Alberta turns into a southbound one-way street and continues to Northwest Boulevard and turns back into a two-way local access road that goes to Grace Avenue. Alberta Street generally serves residential land uses. The speed limit on Alberta Street is 30 MPH.

Ash/Maple Couplet is a north-south couplet that is comprised of 2 one-way streets that begins near Cedar Road through the following arterials: 5-mile road, Francis Avenue, Wellesley Avenue, Garland Avenue, Northwest Boulevard, Maxwell Avenue, and Boone Ave. the couplet ends at 11th Avenue. The couplet serves a mixture of Commercial Uses near intersecting arterial and residential land uses. The speed limit on the Ash/Maple couplet is 30 MPH.

Study Area Intersections

The project study area intersections were identified through discussions with the City of Spokane and WSDOT. The study encompasses the AM & PM Peak hour analysis of the following intersections:

- Indian Trail Road & Barnes Road
- Indian Trail Road & Strong Road/ Pacific Park Drive
- Indian Trail Road & Francis Avenue
- Francis Avenue & Alberta Street
- Francis Avenue & Ash Street
- Francis Avenue & Maple Street

Traffic Control and Descriptions

Indian Trail Road & Barnes Road is a signalized intersection with the following lane configuration: the eastbound approach has a right turn lane, a through lane, a left turn lane, and two receiving lanes. The westbound approach has a through-right lane, a left turn lane and a single receiving lane. The northbound approach has a right turn lane, a through lane, a left turn lane and two receiving lanes. The southbound approach has a right turn lane, a through lane, a left turn lane, and a single receiving lane. All left turns are permitted.

Indian Trail Road & Strong Road/ Pacific Park Drive is a signalized intersection with the

following lane configuration: The East and westbound approaches have a right turn lane, a left through lane, and a single receiving lane. The north and southbound approaches have a right turn lane, a through lane, a left turn lane, and a single receiving lane. All left turns are permitted.

Indian Trail Road & Francis Avenue is a signalized intersection with the following lane configuration: The eastbound approach has two through lanes, a left turn lane and two receiving lanes. The westbound approach has a channelized right turn lane, two through lanes, a two-way-left-turn lane as a spacer and two receiving lanes. All left turns are permitted.

Francis Avenue & Alberta Street is a signalized intersection with the following lane configuration: The eastbound and westbound approaches have a through-right lane, a through lane, a left turn lane, and two receiving lanes. The northbound approach has a left-through-right lane, a left turn lane, and a single receiving lane. The east and westbound left turns are permitted/protected, and the north and southbound phases are split timed.

Francis Avenue & Ash Street is a signalized intersection with the following lane configuration: The eastbound approach has a through-right lane, two through lanes, and two receiving lanes. The westbound approach has a through-right lane, a through lane, a left turn lane, and three receiving lanes. The northbound approach has two receiving lanes. The southbound approach has a right turn lane. Two through lanes, and a left turn lane.

Francis Avenue & Maple Street is a signalized intersection with the following lane configuration: the eastbound approach has a through-right lane, a through lane, a left turn lane, and two receiving lanes. The westbound approach has a through-right lane, and two receiving lanes. The northbound approach has a through-right lane, a through lane, a left-through lane, and a left turn lane. The southbound approach has three receiving lanes.

Traffic Volumes and Peak Hours of Operation

Traffic counts were collected in March 2016 Under the direction of Morrison Maierle Inc., at the following intersections:

- Indian Trail Road & Barnes Road (AM & PM)
- Indian Trail Road & Strong Road/ Pacific Park Drive (AM & PM)
- Indian Trail Road & Francis Avenue (AM & PM)
- Francis Avenue & Alberta Street (AM & PM)
- Francis Avenue & Ash Street (AM & PM)
- Francis Avenue & Maple Street (AM & PM)

Per a previous traffic study the volumes counted at these intersections on Francis Avenue were adjusted for either demand volume or as directed by the City to better model the movement through the intersections of Ash and Maple with Francis Avenue.

The peak hour from these counts are shown on Figures 3 & 4. The raw data for these counts are located in the technical appendix.

Public Transit Transportation

The Spokane Transit Authority (STA) currently provides a weekday service route to this area by Route 23T. Bus stops are located at the following intersections: Indian Trail Road & Strong Road, Indian Trail Road & Lowell Avenue.

Local Trails

There are no walking trails within the area, however all developed roadways in the area include sidewalks.

LEVEL OF SERVICE

Level of service (LOS) is an empirical premise developed by the transportation profession to quantify driver perception for such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles afforded to drivers who utilize the transportation network. It has been defined by the Transportation Research Board in the *2010 Highway Capacity Manual.* This document has quantified level of service into a range from "A" which indicates little, if any, vehicle delay, to "F" which indicates significant vehicle delay and traffic congestion that may lead to system breakdown due to volumes that may exceed capacity.

Signalized Intersections

For signalized intersections, research has determined that average stopped delay per vehicle is the best available measure of level of service. The following tables identify the relationships between level of service and average stopped delay per vehicle. WSDOT wants to maintain LOS D for signalized intersections, but if the LOS is already at E or F, it just needs to be maintained at E or F, and not brought back to LOS D. The Minimum Level of service for a signalized intersection is LOS E.

Level of Service Criteria and Descriptions - Signalized

LOS	Delay Range (sec)	General Description
A	10	• Very low delay at intersection. • All signal cycles clear. • No vehicles wait through more than one signal cycle.
B	10 to 20	• Operating speeds beginning to be affected by other traffic. • Short traffic delays at intersections. • Higher average intersections delays resulting from more vehicles stopping.
C	20 to 35	• Operating speeds and maneuverability closely controlled by other traffic. • Higher delays at intersections than for LOS B due to a significant number of vehicles stopping. • Not all signal cycles clear the waiting vehicles.
D	35 to 55	• Tolerable operating speeds, but long traffic delays occur at intersections • The influence of congestion is noticeable. • Many vehicles stop and the proportion of vehicles not stopping declines. • The number of signal cycle failures, for which vehicles must wait through more than one signal cycle are noticeable.
E	55 to 80	• Speeds are restricted, very long traffic delays are experienced and traffic volumes are near capacity. • Traffic flow is unstable, any interruption, no matter how minor, will cause queues to form and service to deteriorate. • Traffic signal cycle failures are frequent occurrences.
F	80	• Extreme delays resulting in long queues which may interfere with other traffic movements • Stoppages of long duration and speeds may drop to zero. • Vehicle arrival rates are greater than capacity. • Considered unacceptable by most drivers.

Unsignalized Intersections

The calculation of level of service (LOS) at an unsignalized one/two-way stop-controlled intersection is examined in the Transportation Research Board's *2010 Highway Capacity Manual*. For unsignalized intersections, level of service is based on the delay experienced by each movement and approach within the intersection. The concept of delay as presented for unsignalized intersections in the Highway Capacity Manual is based on the amount of time a vehicle must spend at the intersection. Vehicles passing straight through the intersection on the major (uncontrolled) street experience no delay at the intersection. On the other hand, vehicles which are turning left from the minor street, because they must yield the right of way to all right turning vehicles, all left turning vehicles from the major street and all through vehicles on both the minor and major streets, must spend more time at the intersection. Levels of service are assigned to individual movements within the intersection, and are based upon the delay experienced by each movement or approach.

The Transportation Research Board has determined what levels of service for unsignalized intersections should be, by designating level of service A through F, where level of service A represents a facility where no vehicle in any movement is delayed very long and level of service F which represents a facility where there is excessive delay for the average vehicle in at least one movement in the intersection. The City of Spokane and WSDOT have adopted level of service E for all unsignalized intersections within the study area.

Level of Service Criteria and Descriptions - unsignalized

LOS	Delay Range (sec)	Expected Delay to Minor Street Traffic	General Description
A	10	Little to No Delay	• Nearly all drivers find freedom of operation. • Very seldom is there more than one vehicle in the queue.
B	10 to 15	Short Traffic Delays	• Some drivers begin to consider the delay an inconvenience • Occasionally there is more than one vehicle in the queue.
C	15 to 25	Average Traffic Delays	• Many times there is more than one vehicle in the queue. • Most drivers feel restricted, but not objectionably so.
D	25 to 35	Long Traffic Delays	• Often there is more than one vehicle in the queue. • Drivers feel quite restricted.
E	35 to 50	Very Long Traffic Delays	• Represents conditions in which, demand is near or equal capacity. • There is almost always more than one vehicle in the queue. • Drivers find the delays approaching intolerable levels.
F	50	Stop-and-Go Condition Delays Generally Longer than Acceptable	• Forced flow. • Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection

All level of service analyses described in this report were performed in accordance with the procedures described above. As a final note, the Highway Capacity Manual (HCM) analysis and procedures are based upon worst case conditions. Therefore, most of each weekday and the weekends will experience traffic conditions better than those described within this document, which are only for the peak hours of operation.

Existing Level of Service and Traffic Analysis

The existing levels of service at the existing intersections were calculated using the methods from the *2010 Highway Capacity Manual* as implemented in Synchro, *version 9 - Build 909.*

For the intersections of Ash Street and Maple Street with Francis Avenue, given their close proximity the level of service for these intersections utilized an alternative means of calculating level of service, per HCM. This method was used by the City of Spokane and WSDOT in a previous study of the Francis corridor. The following methodology for LOS was applied.

Simtraffic, version 9.1 -build 910, was utilized. The methodology is the creation of a performance report that averages five runs of the peak hour and the stop delay/veh/mvmt is then averaged into "All" as in all of the movements within the intersection. From this value, the LOS delay range can be applied and LOS assigned. It is noted that this methodology given its random number generation, does not follow a linear logic of adding vehicles and having a larger delay, but is reasonable under the industry standards of traffic modeling and recommended by HCM 2010 for closely spaced intersections or areas where overall demand exceeds capacity. This methodology was applied to Maple & Ash Streets intersections with Francis Avenue, for all scenarios.

The existing levels of service for the intersections within the study area are summarized on the following table. The existing traffic volumes used for this report are shown on Figures 3 & 4.

Table 1 - Existing Intersections Levels of Service – Figures 3 & 4

INTERSECTION	(S)ignalized (U)nsignalized	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
Indian Trail Road & Barnes Road	S	18.1	B	14.8	B
Indian Trail Road & Strong Road/ Pacific Park Dr.	S	9.7	A	18.9	B
Indian Trail Road & Francis Avenue	S	12.3	B	7.9	A
Francis Avenue & Alberta Street	S	36.4	D	32.2	C
Francis Avenue & Ash Street	S	12.8	B	17.3	B
Francis Avenue & Maple Street	S	12.0	B	68.5	E

The City of Spokane have established level of service E as the minimum acceptable level for signalized and unsignalized intersections, While WSDOT has established Level of Service D as the minimum acceptable level of service for signalized intersections. Any signalized intersection operating below LOS D should be maintained at the existing level of service.

As shown in Table 1 all intersections are currently functioning at acceptable levels of service.

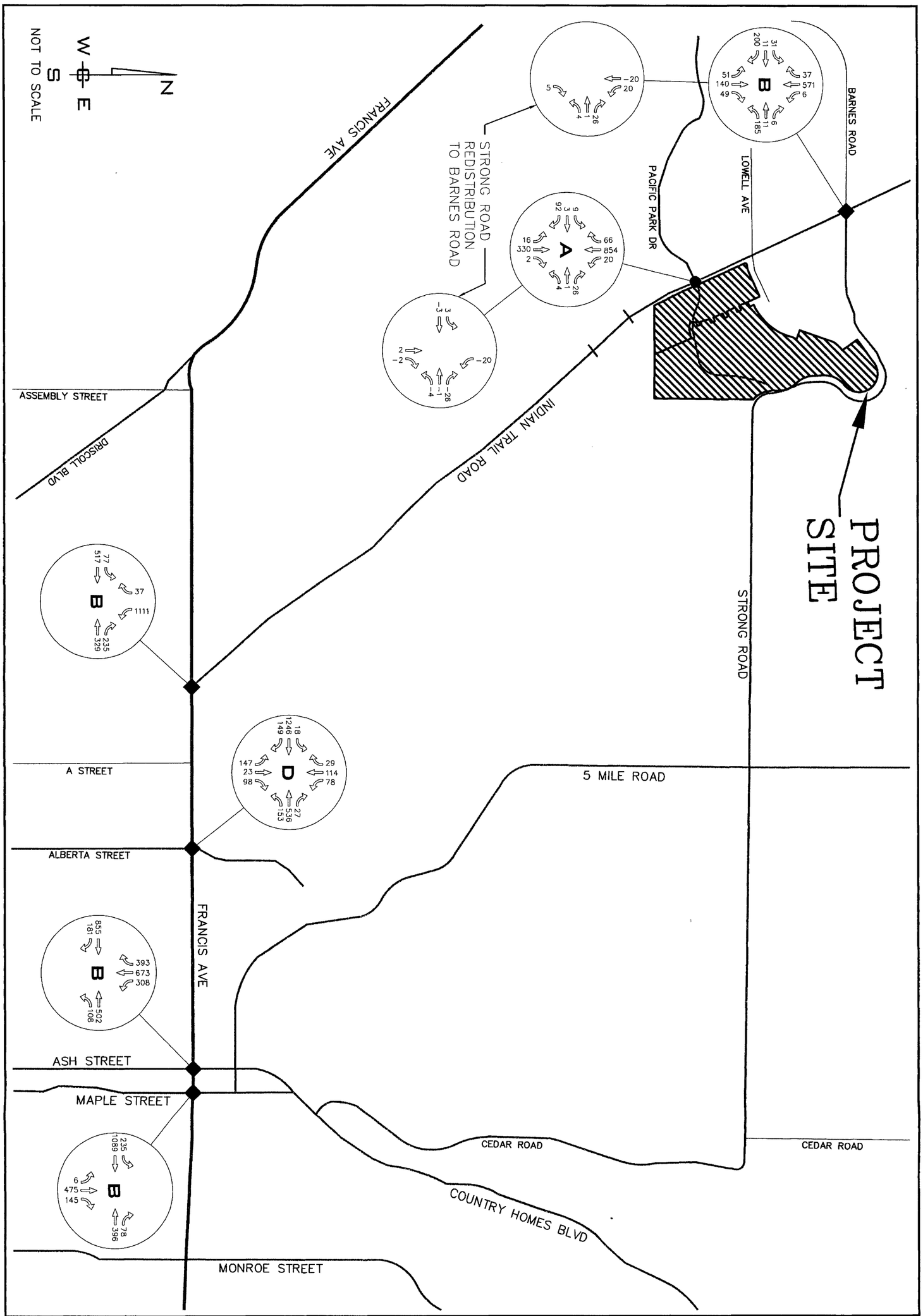

FIGURE 3

TRAFFIC IMPACT ANALYSIS
McCARROLLS EAST
8510 N INDIAN TRAIL ROAD
SPOKANE, WASHINGTON

2016 AM TRAFFIC VOLUMES & LOS

PROJ #: 16-1604
DATE: 11/03/16
DRAWN: RMA
APPROVED: TRW

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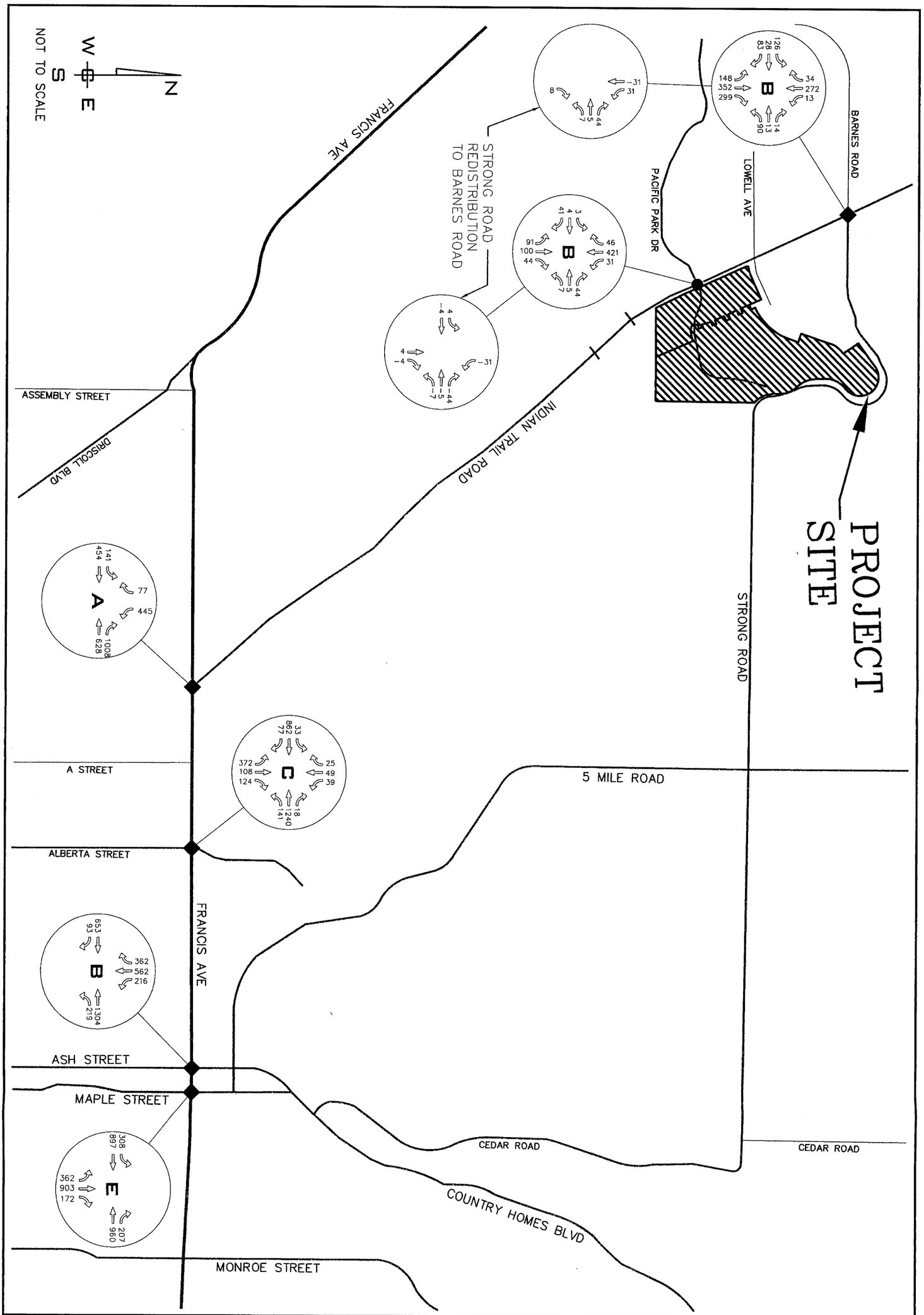

FIGURE 4

TRAFFIC IMPACT ANALYSIS
McCARROLLS EAST
8510 N INDIAN TRAIL ROAD
SPOKANE, WASHINGTON

2016 PM TRAFFIC VOLUMES & LOS

PROJ #: 16-1604
DATE: 11/03/16
DRAWN: RMA
APPROVED: TRW

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