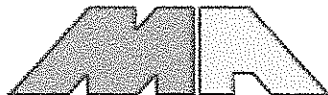


**TRAFFIC IMPACT STUDY**

**FOR**

**CONTINUED OPERATION OF THE HUTTINGA GRAVEL PIT**

**1990 LITTLE BEAR ROAD**  
**GALLATIN GATEWAY, MONTANA**



Prepared By:

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November 22, 2008

**Re: Huttinga Gravel Pit  
Traffic Impact Study**

Please allow this letter and attachments to serve as a summary report for a Traffic Impact Study (TIS) completed for the Huttinga Gravel Pit located on Little Bear Road in Gallatin County, Montana. The TIS was completed in accordance with the Gallatin County Planning Department's requirements, as outlined in a May 5, 2008 memorandum from Greg Sullivan, Gallatin County Planning Director.

**Development Location**

A vicinity map is attached to this letter which shows the boundaries of the Huttinga Gravel Pit in relation to Little Bear Road, Little Bear Spur Road, and Highway 191. The gravel pit is located approximately 1.5 miles from the intersection of Highway 191 and Little Bear Road measured along the Little Bear Road alignment.

**Proposed Gravel Pit Expansion**

The Huttinga Gravel Pit has been in operation for many years and supplies gravel products to numerous construction sites within Gallatin County. The attached Site Plan illustrates the limits of its current permit area and three expansion phases that are required to continue operations into the future.

While the Huttinga Gravel Pit needs to expand the limits of the gravel resource to be mined, the owner does not intend to increase the pit's capacity to supply gravel. The actual amount of gravel sold per day will vary with the demand, but the pit capacity is intended to remain as it exists. Therefore, based on the owner's intentions for the pit, there should be no significant change in the historic number of loads or trips per day.

**Surrounding Land Uses**

The existing land uses in the surrounding area include agriculture and residential. Within a one mile radius of the Huttinga pit, the tract sizes vary from a minimum of 2 acres in Little Bear Subdivision to the south, to 20 acres in Certificate of Survey No. 776 to the west (also residential), to 160 acres or more for agricultural land.



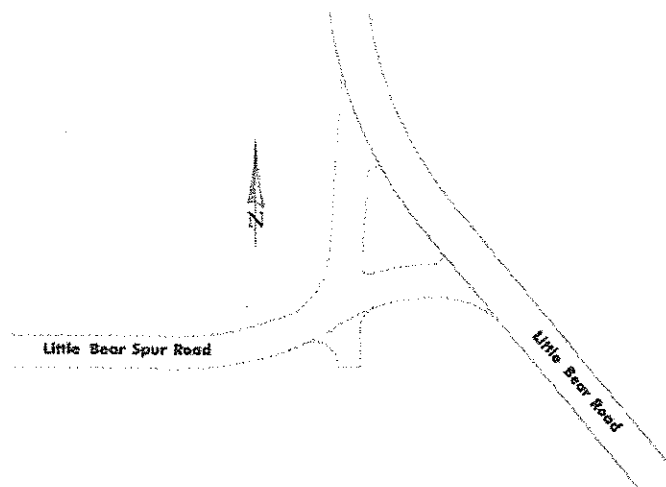
### Existing Transportation Facilities

There are no sidewalks, bike facilities, trails, or transit systems in the area. The only direct access to the pit is from Little Bear Road. Access to Highway 191, north and west of the gravel pit is gained by Little Bear Road and Little Bear Spur Road. Highway 191 is a National Highway of Significance (NHS) route that was constructed and is maintained by the Montana Department of Transportation (MDT). There are no public through roads to the south or east of the pit.

The haul routes between the Huttinga pit and U.S. Highway 191 are Little Bear Road and Little Bear Spur Road. Little Bear Road carries two traffic lanes on a paved surface ranging between 22' and 24' in width. The surface condition is relatively uniform and there are no major surface breaks, cracks, or potholes. There are only two horizontal curves with acute angles. One is at the intersection with Highway 191 and the other is at the intersection with Little Bear Spur Road. Vertical grades along its alignment are relatively constant at approximately +3% from west to east and all vertical curves are minor. Adequate sight distance is available at both the Little Bear Spur Road intersection and at the gravel pit access.

The Little Bear Spur Road is a gravel surface road ranging in width between 20' and 24'. It serves as an access road to approximately 4 residences along its length and also serves as a shortcut between Little Bear Road and Highway 191 for drivers with origins or destinations south on Highway 191.

Little Bear Spur Road intersects Little Bear Road at a curve. The intersection utilizes split access as pictured below. There are no stop or yield signs existing at this intersection.





The intersections of Little Bear Road and Little Bear Spur Road with Highway 191 are fully controlled with auxiliary turn lanes and the most current traffic control devices. Operations at those intersections are under the jurisdiction of MDT and existing controls were designed by MDT for operations that would exist in the distant future.

### **Existing Traffic Volumes**

Electronic traffic counters were used to count bi-directional traffic at three locations between October 29, 2008 and November 2, 2008. Appendix A contains hourly summaries of the traffic volume counts. The attached Figure 1 provides a summary of average weekday traffic (AWT) volumes and peak am and pm turning movement counts at the intersection of Little Bear Road and Little Bear Spur Road and at the gravel pit access to Little Bear Road. Electronic classification counts indicated that approximately 4% of the AWT volumes were gravel trucks. This was confirmed during the peak hour counting periods where approximately 5% of the traffic consisted of gravel trucks.

Also contained in Appendix A is a traffic count summary from a count taken on Little Bear Road, west of the gravel pit, in June of 2003. In order to compare the 2003 counts to the 2008 counts, monthly traffic variations taken from the MDT permanent count station data for Highway 191 were used to determine the annual average weekday traffic (AAWT) volumes. Resulting calculations indicate that the 2003 AAWT on Little Bear Road, west of the gravel pit, was 485 while the 2008 AAWT was 510, an increase of approximately 5%. Thus, traffic has been increasing on Little Bear Road at an approximate rate of 1% per year. The current AAWT on other road segments in the area were calculated to be 430 on Little Bear Road, south of Highway 191 and 60 AAWT on Little Bear Spur Road, west of Highway 191.

### **Existing Speeds**

The electronic counters also registered speeds at the count stations. Appendix B contains speed statistics for the two Little Bear Road locations. It was determined that the 85<sup>th</sup>% speed on Little Bear Road south of Highway 191 was approximately 40 mph and the 85<sup>th</sup>% speed on Little Bear Road west of the gravel pit was approximately 45 mph. Since the Spur Road count station was in close proximity to the Highway 191 intersection, speed statistics from that station would not represent free flow conditions and thus, are not reported herein.

### **Existing Capacity**

Capacity calculations for am and pm hours at the Little Bear Road – Little Bear Spur Road intersection and the gravel pit access approach to Little Bear Road were completed and can be found in appendix C. It was determined that all approaches and all movements currently operate at LOS "A".



**Trip Generation**

There are no land use categories within the ITE Trip Generation Report similar to the proposed gravel pit operations. Since future gravel pit operations will echo past operations, historic trip data can be used to determine future trip demand associated with this development. The following information was supplied by the owner:

The weight of loaded trucks will vary with the truck type. The maximum, gross weight for a gravel truck is 106,000 pounds, with the appropriate axles, etc. to remain within the legal load limit. Trip distribution is random, and totally dependent on the location of the job site in relation to the pit. The range of the number of trips per day should not change as this is an existing pit with no planned increase in material sales. The gravel operation varies with the seasons, and the economy. The greatest traffic observed at the existing pit was during the spring and summer of 2007. The quantity of gravel sold by the pit, by calendar quarter, during 2007, is as follows:

Jan. - March:	10,911 tons
April - June:	78,966 tons
July - Sept.:	88,601 tons
Oct. - Dec.:	51,668 tons

The total loads of gravel leaving the pit during 2007, follow the same trend:

Month	Total Loads	Loads on 5 Highest Days
Jan.	193	17, 21, 23, 24, 26
Feb.	159	11, 11, 16, 16, 20
March	276	19, 19, 22, 29, 32
April	448	27, 32, 42, 46, 64
May	1752	94, 108, 117, 121, 142
June	1465	87, 90, 100, 115, 144
July	1256	64, 64, 72, 76, 78
Aug.	1297	70, 71, 77, 80, 91
Sept.	927	53, 63, 74, 78, 79
Oct.	1017	66, 78, 82, 91, 105
Nov.	432	26, 30, 39, 47, 72
Dec.	118	13, 14, 17, 20, 20

The number of loads per month through September, 2008, has been significantly lower than the same months in 2007.

2008 Month	Total Loads
Jan.,	15
Feb.	35



March	108
April	121
May	366
June	342
July	336
Aug.	547
Sept.	471

In order to introduce conservatism into the analysis, 2007 load counts are used to determine truck traffic projections for future gravel pit operations. From the above data, the annual average daily number of loads would be 22.5, which would be equivalent to 45 truck trips on the average day (22.5 entering and 22.5 leaving). The peak or record day in 2007 was 144 loads or 288 truck trips on a single day. Another statistical measure of truck trips would be the 30<sup>th</sup> highest hour, which would equate to the methodology typically used to design roadways. From the list of 5 highest days, an interpolative calculation would result in the 30<sup>th</sup> highest day being approximately 80 trips. Impact calculations contained herein utilize the design day and maximum or record day to determine if there would be capacity or safety issues associated with truck usage. Structural loading calculations on the roadway should use the AAWT traffic volumes to represent repetitive loadings over long time periods.

In order to determine peak hour trips, it was assumed that daily operations would be over an 8 hour period and truck traffic would be continuous over that period. Thus, peak am and pm hour traffic would both be 1/8 of the AAWT, design day, and maximum (record day) totals. The peak am and pm hour truck trips would be as follows:

	AM Hour		PM Hour	
	Enter	Exit	Enter	Exit
AAWT	3	3	3	3
30 <sup>th</sup> High Design Day	5	5	5	5
Maximum – Record Day	18	18	18	18

**Trip Distribution**

Distribution of truck traffic is totally dependent upon where construction projects are located relative to the gravel pit. However, construction activity is most likely to occur at locations where there is the most development activity and population density. Thus, average truck distribution would be similar to distribution of traffic on the existing system. In that case, it has been estimated that 15% of the trips would be distributed to the south and west using the Little Bear Spur Road access to Highway 191 and 85% would be distributed north and east using the Little Bear Road access to Highway 191.



## Traffic Assignment

Figure 2 presents the AWT, 30<sup>th</sup> highest volume, and record day truck traffic assignments on the area roads. Also shown in Figure 2 are the peak hour truck traffic turning movements at the two subject intersection for the 30<sup>th</sup> highest hour and the record hour conditions. These traffic assignments reflect the direct application of truck trip generation to the above noted trip distribution percentages.

## Year 2013 Traffic

From the historic traffic records previously mentioned, it has been determined that traffic volumes on the area roadways will increase by approximately 1% per year. Over the next 5 years, traffic volumes would then increase by a factor of approximately 1.05. Figure 3 illustrates projected traffic for the year 2013 combined with the record gravel pit traffic day. The maximum or record truck traffic day is used to represent the worst traffic situation that could likely be encountered in this future time period.

## Year 2013 Capacity

Capacity calculations (Appendix C) indicate that that all approaches and all movements at both of the intersection during both the am and pm hour periods would operate at LOS "A". No substantial capacity impacts would result from continued gravel pit operations.

## Safety

The existing intersections have adequate intersection sight distance for prevailing speeds on the area's roadways. Right-of-way at the existing intersection of Little Bear Road and Little Bear Spur Road is currently uncontrolled and even though the split approach operation is not conventional, existing and future traffic volumes are so low that the probability of multiple vehicles entering the intersection at the same time is substantially less than 1%. However, traffic on Little Bear Road is greater than on the Little Bear Spur Road and it should be a higher classification of roadway. According to MUTCD, a stop sign on the Little Bear Spur Road would be warranted.

## Auxiliary Turn Lanes

MDT guidelines for left and right turn lanes were checked and it was determined that traffic volumes at the two study intersections are so low that none of the year 2103 traffic volumes are even close to the minimum warranting volumes.



### Parking & Storage Needs

There is ample on-site area for employee parking and truck operation storage. Expansion of the pit will allow even more on-site area for truck loading operations.

### Conclusions

The expansion of the Huttinga Gravel Pit is not planned to increase production capacity of the operations and future truck traffic will be at a level equal to past operations. There are no current capacity or safety issues on the existing roadway system and future traffic growth projections indicate that additional demand on the road system will not have substantial impacts.

It is recommended that stop sign control be instituted on Little Bear Spur Road at its intersection with Little Bear Road to alert drivers on the spur road that Little Bear Road is the main roadway and right-of-way should be given to traffic on that road. The unconventional geometry of this intersection could presents future safety concerns if the volume of traffic entering the intersection were to double or triple at some future date. Reconstruction of the Little Bear Spur Road intersection approach may need to be considered if major developments are proposed in the future.

Respectfully Submitted,

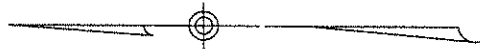
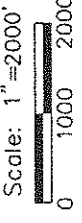
Robert R. Marvin, P.E., P.T.O.E.



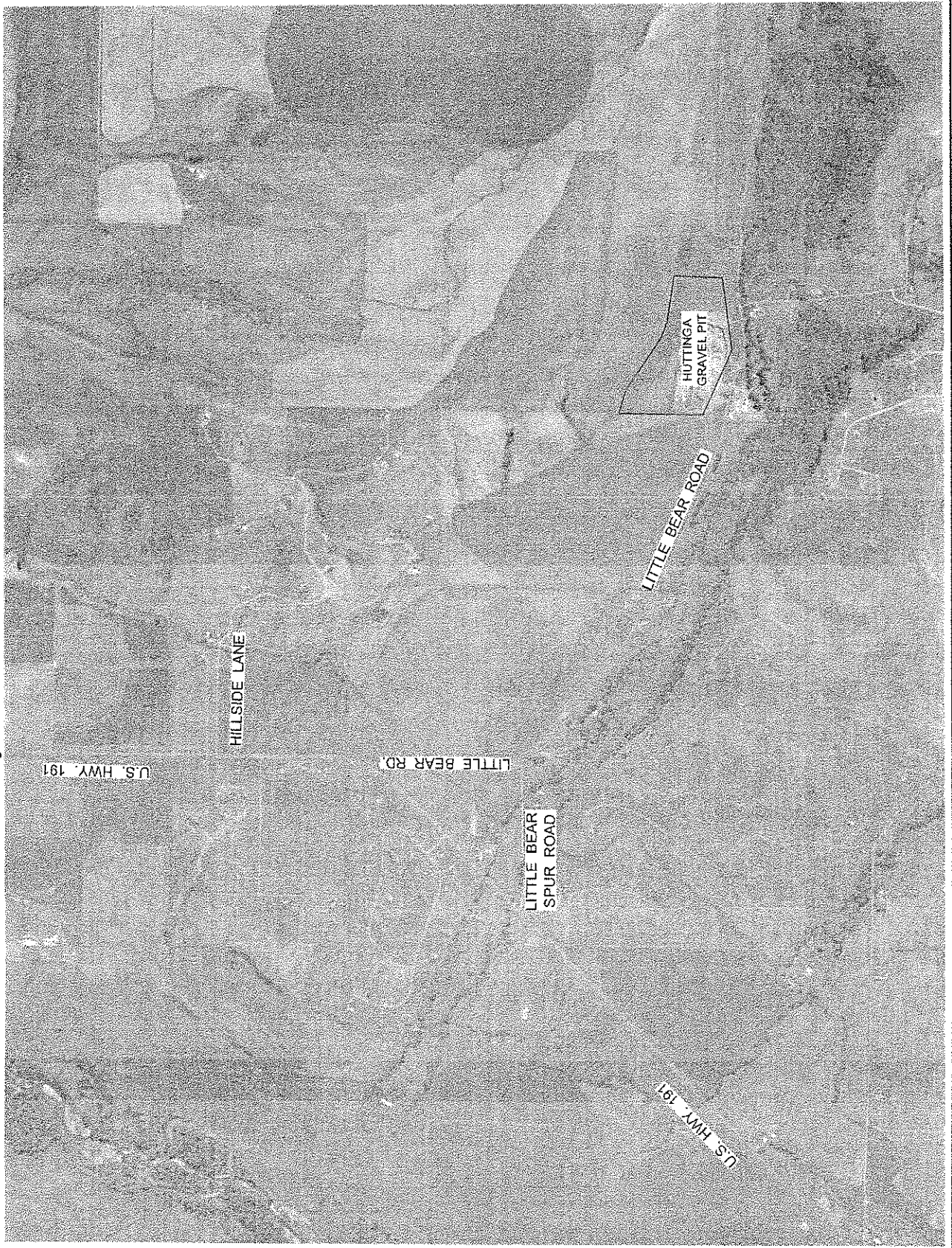
# VICINITY MAP

## HUTTINGA GRAVEL PIT

Located in the S½ NE¼, Sec. 25, T.35S, R.4E., P.M.M.  
Gallatin County, Montana



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Drawing File Name: 1311-Huttinga.dwg 10/14/2008



Scale: 1" = 600'



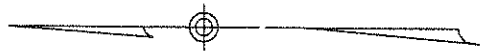
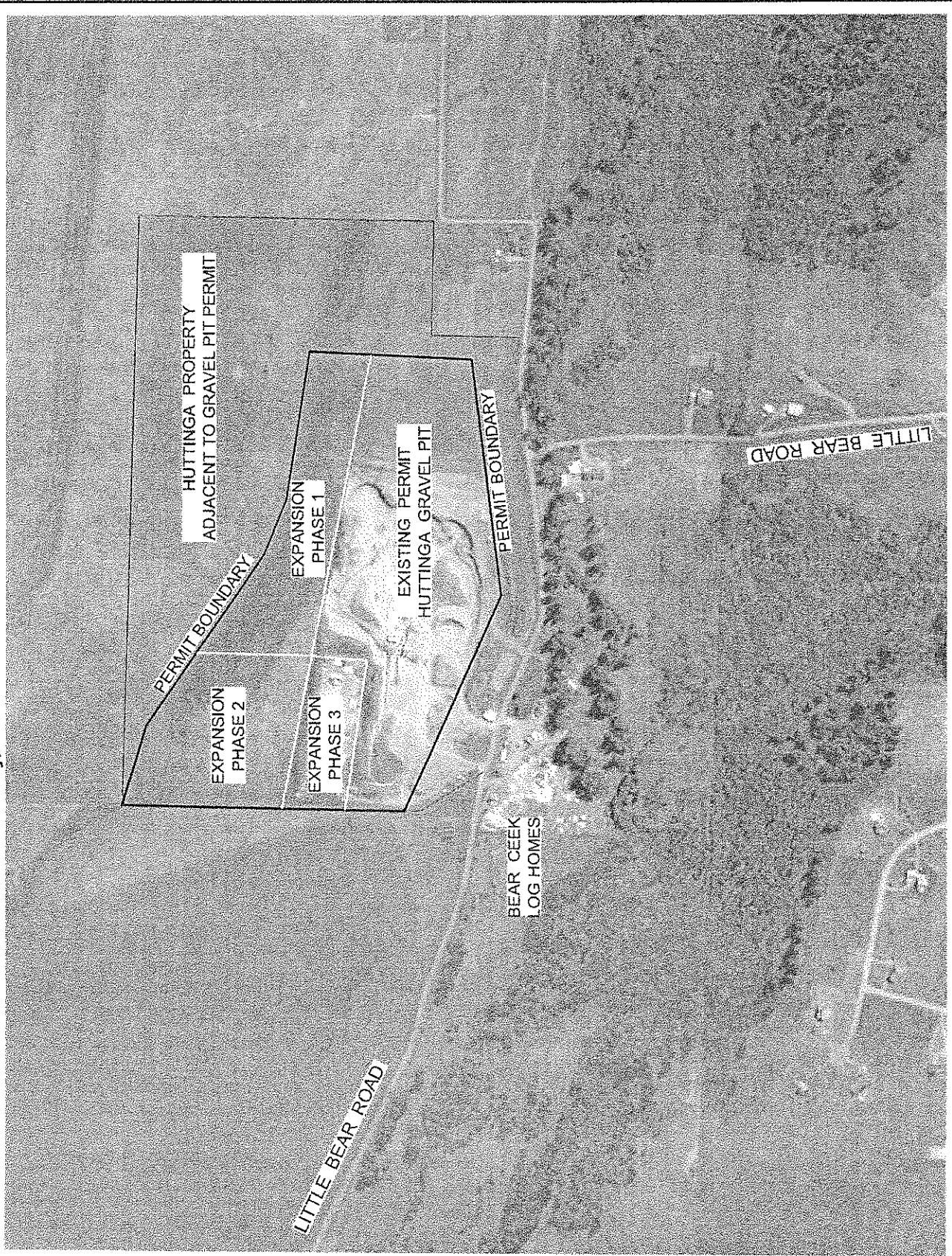
2005 Aerial Photo

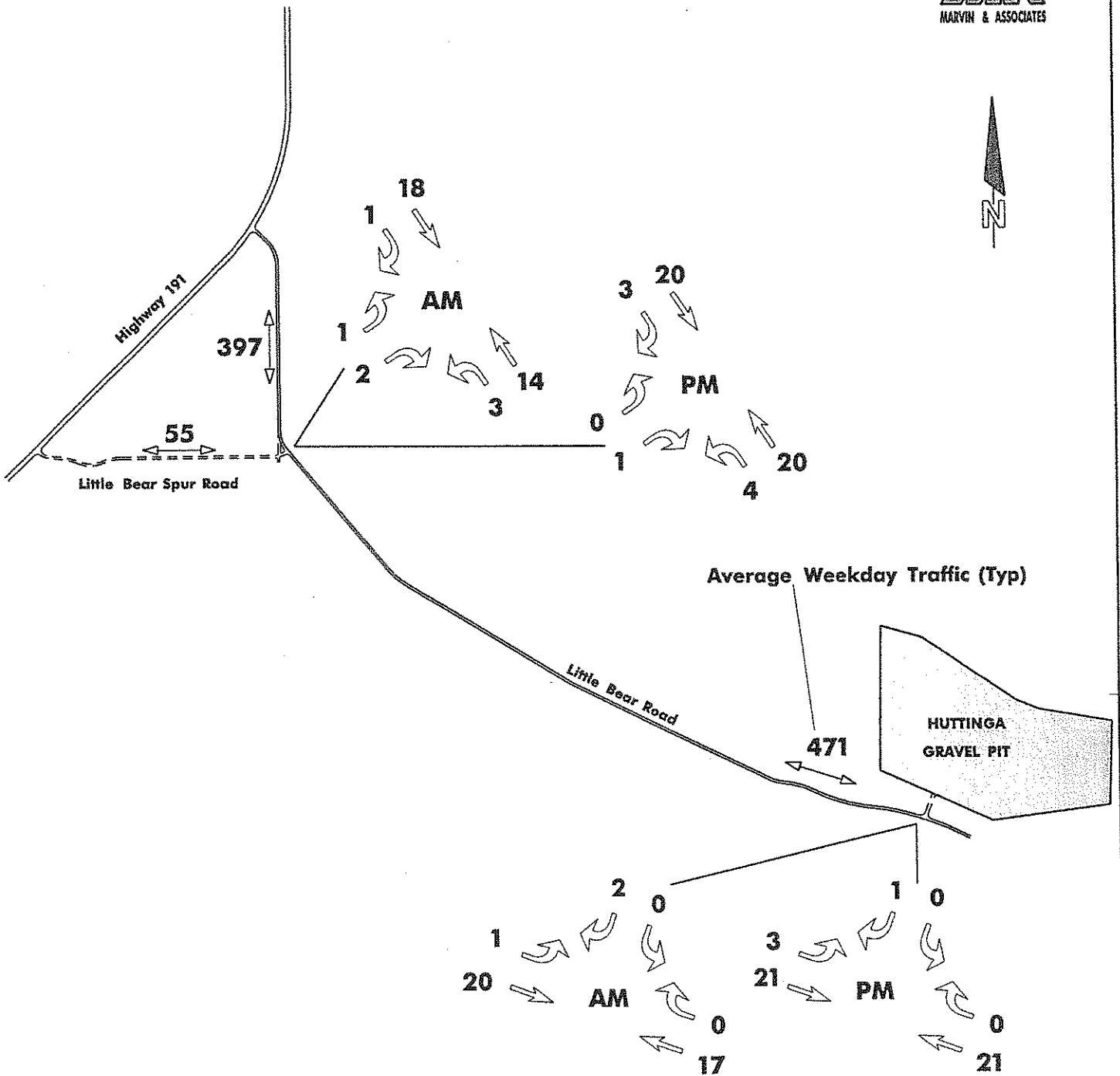
# SITE PLAN

## HUTTINGA GRAVEL PIT

Located in the SW 1/4, Sec. 25, T.3S, R.4E., P.M.M.  
Gallatin County, Montana

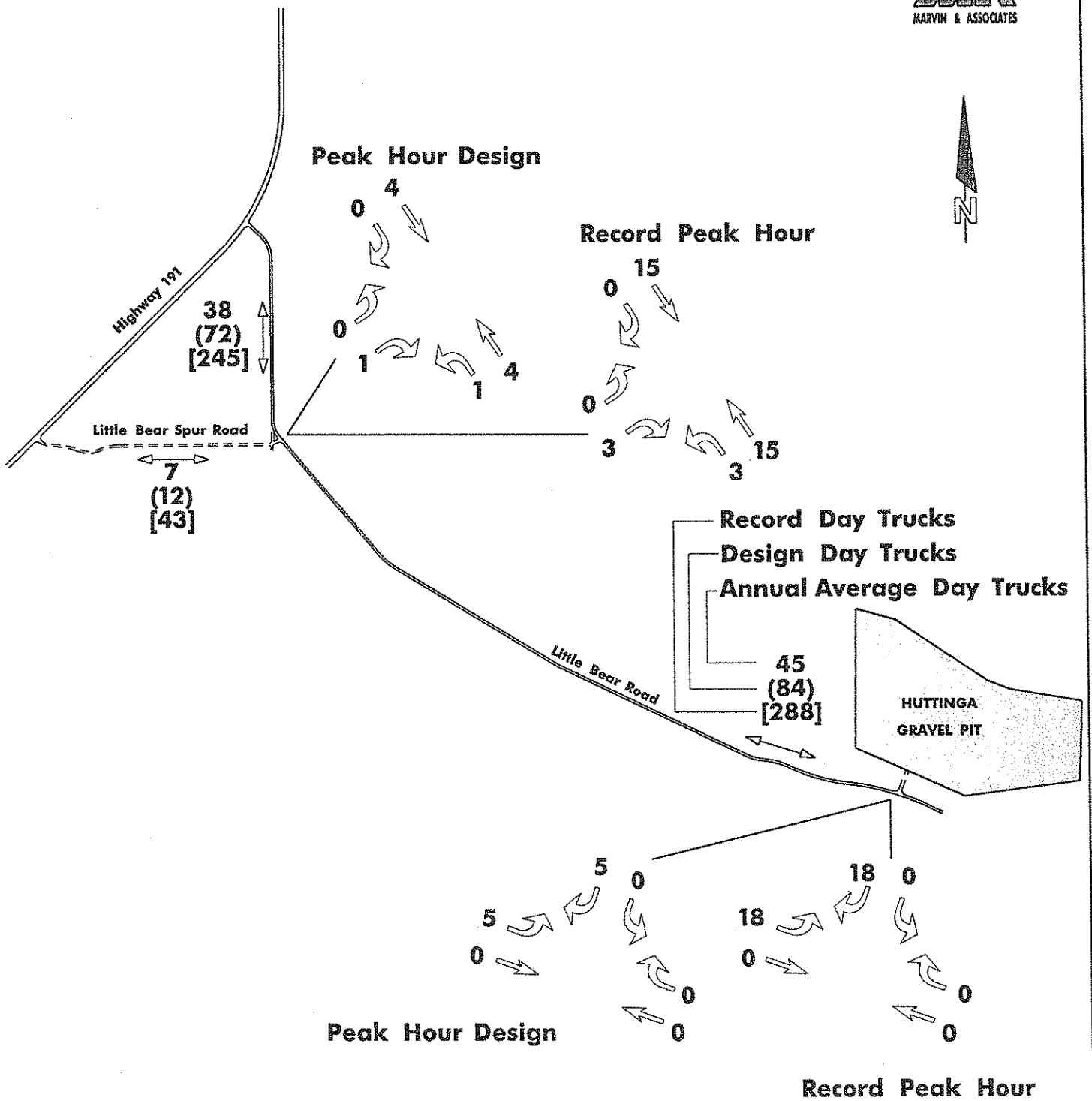
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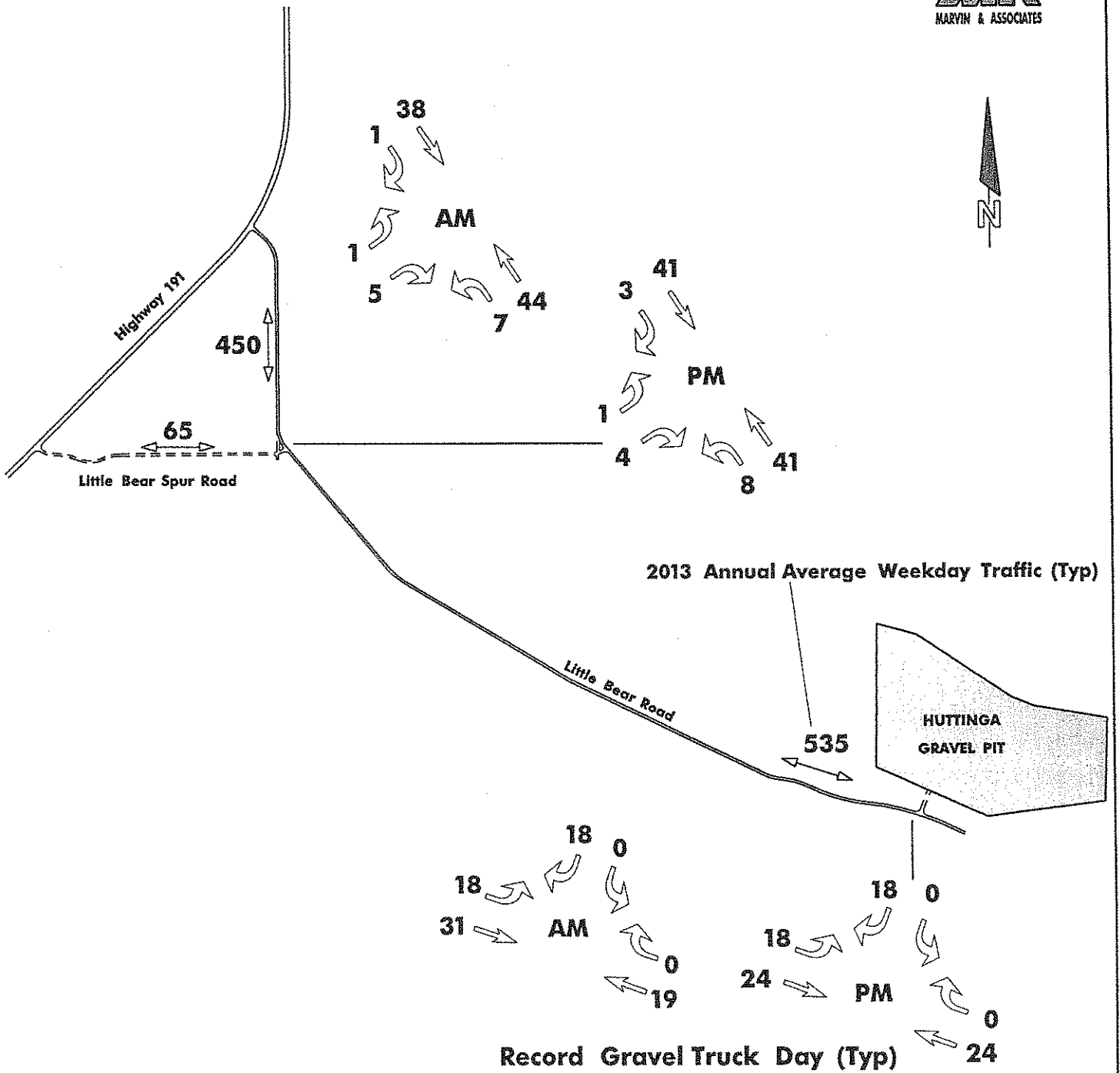


**Figure 1. October 2008 Traffic Counts**





**Figure 2. Gravel Truck Volume Projections**



**Figure 3. Year 2013 Traffic Projections With Maximum Gravel Truck Traffic**