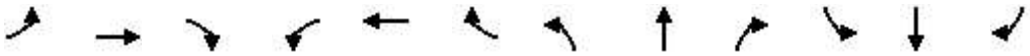
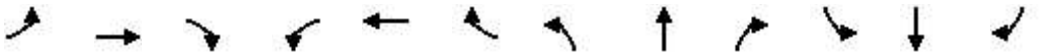


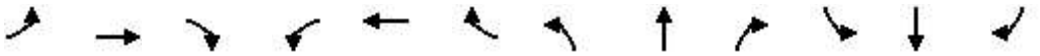
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	48	0	0	31	0	0	8	0	0	1	0
Future Volume (vph)	0	48	0	0	31	0	0	8	0	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt												
Flt Protected												
Satd. Flow (prot)	0	1634	0	0	1634	0	0	1634	0	0	1634	0
Flt Permitted												
Satd. Flow (perm)	0	1634	0	0	1634	0	0	1634	0	0	1634	0
Link Speed (k/h)		90			90			90			90	
Link Distance (m)		673.1			1640.0			543.4			1044.7	
Travel Time (s)		26.9			65.6			21.7			41.8	
Lane Group Flow (vph)	0	48	0	0	31	0	0	8	0	0	1	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			



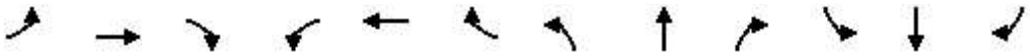
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	31	3	1	2	28	2058	9	1	743	7
Future Volume (vph)	10	0	31	3	1	2	28	2058	9	1	743	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.898			0.955			0.999			0.999	
Flt Protected		0.988			0.976			0.999				
Satd. Flow (prot)	0	1450	0	0	1717	0	0	3487	0	0	3241	0
Flt Permitted		0.988			0.976			0.999				
Satd. Flow (perm)	0	1450	0	0	1717	0	0	3487	0	0	3241	0
Link Speed (k/h)		90			90			100			90	
Link Distance (m)		1640.0			885.2			667.4			1223.1	
Travel Time (s)		65.6			35.4			24.0			48.9	
Lane Group Flow (vph)	0	41	0	0	6	0	0	2095	0	0	751	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 87.0%		ICU Level of Service E	
Analysis Period (min) 15			



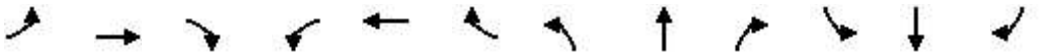
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	10	0	0	1	0	0	10	0	0	1	0
Future Volume (vph)	0	10	0	0	1	0	0	10	0	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt												
Flt Protected												
Satd. Flow (prot)	0	1842	0	0	1842	0	0	1842	0	0	1842	0
Flt Permitted												
Satd. Flow (perm)	0	1842	0	0	1842	0	0	1842	0	0	1842	0
Link Speed (k/h)		90			90			90			90	
Link Distance (m)		673.1			1640.0			543.4			1044.7	
Travel Time (s)		26.9			65.6			21.7			41.8	
Lane Group Flow (vph)	0	10	0	0	1	0	0	10	0	0	1	0
Sign Control		Free			Yield			Free			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			



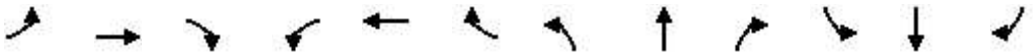
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	1	4	1	2	6	2059	11	1	906	0
Future Volume (vph)	0	0	1	4	1	2	6	2059	11	1	906	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.865			0.961			0.999				
Flt Protected					0.972							
Satd. Flow (prot)	0	1593	0	0	1721	0	0	3496	0	0	3246	0
Flt Permitted					0.972							
Satd. Flow (perm)	0	1593	0	0	1721	0	0	3496	0	0	3246	0
Link Speed (k/h)		90			90			100			90	
Link Distance (m)		1640.0			885.2			667.4			1223.1	
Travel Time (s)		65.6			35.4			24.0			48.9	
Lane Group Flow (vph)	0	1	0	0	7	0	0	2076	0	0	907	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 72.0%		ICU Level of Service C	
Analysis Period (min) 15			



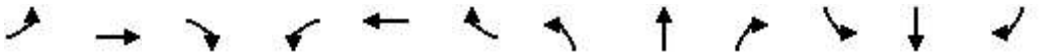
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	31	4	1	2	29	2509	11	1	906	7
Future Volume (vph)	10	0	31	4	1	2	29	2509	11	1	906	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1450	0	0	1721	0	0	3488	0	0	3241	0
Flt Permitted		0.988			0.972			0.999				
Satd. Flow (perm)	0	1450	0	0	1721	0	0	3488	0	0	3241	0
Link Speed (k/h)		90			90			100			90	
Link Distance (m)		1640.0			885.2			667.4			1223.1	
Travel Time (s)		65.6			35.4			24.0			48.9	
Lane Group Flow (vph)	0	41	0	0	7	0	0	2549	0	0	914	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 100.1%		ICU Level of Service G	
Analysis Period (min) 15			



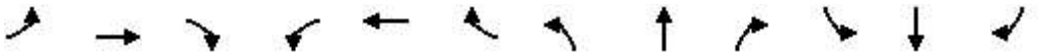
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	0	50	0	0	31	0	0	10	0	0	1	0
Future Volume (vph)	0	50	0	0	31	0	0	10	0	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1634	0	0	1634	0	0	1634	0	0	1634	0
Flt Permitted												
Satd. Flow (perm)	0	1634	0	0	1634	0	0	1634	0	0	1634	0
Link Speed (k/h)		90			90			90			90	
Link Distance (m)		673.1			1640.0			543.4			1044.7	
Travel Time (s)		26.9			65.6			21.7			41.8	
Lane Group Flow (vph)	0	50	0	0	31	0	0	10	0	0	1	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			



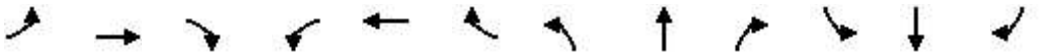
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	31	4	1	2	29	2272	11	1	1176	7
Future Volume (vph)	10	0	31	4	1	2	29	2272	11	1	1176	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	1450	0	0	1721	0	0	3487	0	0	3395	0
Flt Permitted		0.988			0.972			0.999				
Satd. Flow (perm)	0	1450	0	0	1721	0	0	3487	0	0	3395	0
Link Speed (k/h)		90			90			100			90	
Link Distance (m)		1640.0			885.2			667.4			1223.1	
Travel Time (s)		65.6			35.4			24.0			48.9	
Lane Group Flow (vph)	0	41	0	0	7	0	0	2312	0	0	1184	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 93.6%		ICU Level of Service F	
Analysis Period (min) 15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	50	0	0	31	0	0	10	0	0	1	0
Future Volume (vph)	0	50	0	0	31	0	0	10	0	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt												
Flt Protected												
Satd. Flow (prot)	0	1634	0	0	1634	0	0	1634	0	0	1634	0
Flt Permitted												
Satd. Flow (perm)	0	1634	0	0	1634	0	0	1634	0	0	1634	0
Link Speed (k/h)		90			90			90			90	
Link Distance (m)		673.1			1640.0			543.4			1044.7	
Travel Time (s)		26.9			65.6			21.7			41.8	
Lane Group Flow (vph)	0	50	0	0	31	0	0	10	0	0	1	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	31	4	1	2	29	2046	11	1	1055	7
Future Volume (vph)	10	0	31	4	1	2	29	2046	11	1	1055	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6	3.6	3.5	3.6
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.898			0.961			0.999			0.999	
Flt Protected		0.988			0.972			0.999				
Satd. Flow (prot)	0	1450	0	0	1721	0	0	3487	0	0	3394	0
Flt Permitted		0.988			0.972			0.999				
Satd. Flow (perm)	0	1450	0	0	1721	0	0	3487	0	0	3394	0
Link Speed (k/h)		90			90			100			90	
Link Distance (m)		1640.0			885.2			667.4			1223.1	
Travel Time (s)		65.6			35.4			24.0			48.9	
Lane Group Flow (vph)	0	41	0	0	7	0	0	2086	0	0	1063	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 87.4%		ICU Level of Service E	
Analysis Period (min) 15			

APPENDIX

C GAP STUDY DATA

Study Name Mollard and Brookside GAP
Start Date 04/26/2018
Start Time 7:00 AM

Left from Minor

	2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.5 - 5.0	5.0 - 5.5	5.5 - 6.0	6.0 - 6.5	6.5 - 7.0	7.0 - 7.5	7.5 - 8.0	8.0 - 8.5	8.5 - 9.0	9.0 - 9.5	9.5 - 10.0	10.0 - 10.5	10.5 - 11.0	11.0 - 11.5	11.5 - 12.0	12.0 - 12.5	12.5 - 13.0	13.0 - 13.5	13.5 - 14.0	14.0 - 14.5	14.5 - 15.0	15.0 - 15.5	15.5 - 16.0	16.0 - 16.5	16.5 - 17.0	17.0 - 17.5	17.5 - 18.0	18.0 - 18.5	18.5 - 19.0	19.0 - 19.5	19.5 - 20.0	20.0 - 20.5	20.5 - 21.0	21.0 - 21.5	21.5 - 22.0	22.0 - 22.5	22.5 - 23.0	23.0 - 23.5	23.5 - 24.0	24.0 - 24.5	24.5 - 25.0	25.0 - 25.5	25.5 - 26.0	26.0 - 26.5	26.5 - 27.0	27.0 - 27.5	27.5 - 28.0	28.00+	Critical Gaps (10.0 sec)	Follow-up Gaps (7.5 sec)	Total Gaps
7:00 AM	30	21	15	18	11	6	3	3	4	2	1	1	1	3	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
7:15 AM	29	17	19	9	13	7	7	3	1	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
7:30 AM	30	19	14	9	7	2	2	3	2	4	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
7:45 AM	29	23	21	11	13	5	0	4	4	1	3	1	2	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
8:00 AM	23	17	19	9	7	6	7	4	2	5	3	2	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
8:15 AM	30	19	21	11	9	7	5	6	0	0	1	1	1	1	2	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
8:30 AM	21	19	9	16	7	12	8	8	1	7	4	1	4	1	1	0	0	2	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6
8:45 AM	21	20	13	6	5	7	8	5	6	5	5	1	1	1	4	0	0	1	0	0	1	1	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	8	2	10
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	28	21	9	7	4	3	0	7	0	2	2	3	1	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	6
3:45 PM	24	22	16	6	7	6	2	2	1	3	0	1	2	1	2	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
4:00 PM	30	16	15	7	6	4	4	1	2	1	1	3	1	1	3	1	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
4:15 PM	29	14	12	5	9	5	1	4	2	3	1	2	2	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
4:30 PM	33	22	15	6	3	3	3	2	1	3	1	1	0	0	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
4:45 PM	30	13	14	7	7	8	6	2	1	1	2	2	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
5:00 PM	25	9	14	10	3	5	6	8	5	2	1	1	1	2	1	1	0	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
5:15 PM	35	14	11	11	9	2	0	3	1	3	1	1	1	2	2	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	4
5:30 PM	27	11	20	5	10	8	6	6	2	2	3	2	1	0	1	1	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	1	5
5:45 PM	23	18	11	10	15	5	7	5	4	1	1	2	4	2	0	1	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	2	7
6:00 PM	16	17	15	12	12	5	6	3	0	4	3	2	3	3	2	2	0	1	2	3	1	0	0	0	1	2	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	13
6:15 PM	21	18	12	11	9	11	2	8	2	3	5	1	2	3	1	0	4	1	1	1	0	0	1	1	0	1	0	0	0	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	4	19

A.M. Peak I 6
P.M. Peak I 6

Study Name Mollard and Brookside GAP
Start Date 04/26/2018
Start Time 7:00 AM

Eastbound Right from Minor

	2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.5 - 5.0	5.0 - 5.5	5.5 - 6.0	6.0 - 6.5	6.5 - 7.0	7.0 - 7.5	7.5 - 8.0	8.0 - 8.5	8.5 - 9.0	9.0 - 9.5	9.5 - 10.0	10.0 - 10.5	10.5 - 11.0	11.0 - 11.5	11.5 - 12.0	12.0 - 12.5	12.5 - 13.0	13.0 - 13.5	13.5 - 14.0	14.0 - 14.5	14.5 - 15.0	15.0 - 15.5	15.5 - 16.0	16.0 - 16.5	16.5 - 17.0	17.0 - 17.5	17.5 - 18.0	18.0 - 18.5	18.5 - 19.0	19.0 - 19.5	19.5 - 20.0	20.0 - 20.5	20.5 - 21.0	21.0 - 21.5	21.5 - 22.0	22.0 - 22.5	22.5 - 23.0	23.0 - 23.5	23.5 - 24.0	24.0 - 24.5	24.5 - 25.0	25.0 - 25.5	25.5 - 26.0	26.0 - 26.5	26.5 - 27.0	27.0 - 27.5	27.5 - 28.0	28.00+	Critical Gaps (10.0 sec)	Follow-up Gaps (7.5 sec)	Total Gaps
7:00 AM	26	18	10	12	10	8	5	3	6	0	3	3	1	2	2	5	0	1	1	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5
7:15 AM	24	17	17	11	14	8	6	5	0	0	3	2	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
7:30 AM	27	22	14	11	5	6	3	6	3	3	2	0	0	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	5
7:45 AM	31	26	11	10	13	6	1	5	7	3	4	1	2	0	0	0	0	2	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	7	2	9
8:00 AM	20	22	17	7	8	4	6	5	2	6	3	2	2	3	0	1	0	0	2	2	2	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	9
8:15 AM	27	15	15	11	3	11	5	5	2	2	3	1	5	2	2	0	2	1	1	1	3	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	12	1	13
8:30 AM	20	8	6	14	8	5	7	6	5	5	3	3	3	0	1	5	1	3	0	0	2	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	14	7	21
8:45 AM	14	15	14	8	5	5	7	7	6	3	7	3	1	2	2	0	0	1	0	0	3	2	3	0	2	0	1	0	0	1	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	17	4	21
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	14	9	7	8	10	9	5	1	6	5	7	2	1	2	0	0	2	1	2	1	0	0	1	2	2	0	0	1	1	1	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	4	22	13	35
3:45 PM	15	13	16	6	7	9	4	4	4	5	2	2	1	2	3	2	3	2	2	1	0	1	0	4	2	3	1	1	0	0	1	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	4	29
4:00 PM	14	11	2	6	7	7	5	2	5	5	2	2	1	0	1	4	1	1	2	2	2	1	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	1	3	24	21	45
4:15 PM	9	10	10	8	8	6	8	3	6	2	1	1	5	1	1	2	2	1	2	2	1	0	1	1	0	1	1	2	1	0	0	2	0	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	24	9	33
4:30 PM	11	9	14	8	7	6	3	4	1	5	7	5	1	5	1	1	2	0	0	0	2	2	0	1	0	0	0	0	0	4	1	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	20	10	30
4:45 PM	13	12	8	10	6	3	4	6	5	1	4	6	2	2	1	3	2	2	3	4	1	0	1	2	0	2	1	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	26	7	33
5:00 PM	18	13	6	7	6	7	4	2	1	4	2	2	5	4	1	2	2	2	0	1	1	0	3	1	2	0	2	1	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	3	24	13	37
5:15 PM	15	13	5	9	9	5	7	8	7	3	1	2	4	2	6	1	3	0	1	1	1	2	1	0	1	1	1	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	17	7	24
5:30 PM	11	2	6	5	7	7	4	4	4	3	2	4	2	4	3	0	1	1	0	1	0	0	0	1	5	4	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	3	23	11	34
5:45 PM	3	7	10	5	10	5	3	5	3	4	4	2	4	2	0	4	0	0	4	1	0	0	2	1	0	2	0	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	3	21	11	32
6:00 PM	6	6	6	6	3	0	5	3	2	4	1	3	0	0	5	3	1	1	3	1	2	3	0	1	0	1	0	0	0	1	0	2	0	0	0	2	0	0	0	0	0	0	1	0	1	0	1	1	1	0	4	28	24	52
6:15 PM	6	3	7	6	1	3	3	3	1	5	2	2	1	1	1	1	3	2	1	2	0	1	2	1	0	1	1	1	2	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	0	2	29	24	53

A.M. Peak I 23
P.M. Peak I 141

Study Name Mollard and Brookside GAP
Start Date 04/26/2018
Start Time 7:00 AM

Northbound Left from Major

	2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.5 - 5.0	5.0 - 5.5	5.5 - 6.0	6.0 - 6.5	6.5 - 7.0	7.0 - 7.5	7.5 - 8.0	8.0 - 8.5	8.5 - 9.0	9.0 - 9.5	9.5 - 10.0	10.0 - 10.5	10.5 - 11.0	11.0 - 11.5	11.5 - 12.0	12.0 - 12.5	12.5 - 13.0	13.0 - 13.5	13.5 - 14.0	14.0 - 14.5	14.5 - 15.0	15.0 - 15.5	15.5 - 16.0	16.0 - 16.5	16.5 - 17.0	17.0 - 17.5	17.5 - 18.0	18.0 - 18.5	18.5 - 19.0	19.0 - 19.5	19.5 - 20.0	20.0 - 20.5	20.5 - 21.0	21.0 - 21.5	21.5 - 22.0	22.0 - 22.5	22.5 - 23.0	23.0 - 23.5	23.5 - 24.0	24.0 - 24.5	24.5 - 25.0	25.0 - 25.5	25.5 - 26.0	26.0 - 26.5	26.5 - 27.0	27.0 - 27.5	27.5 - 28.0	28.00+	Critical Gaps (10.0 sec)	Follow-up Gaps (7.5 sec)	Total Gaps
7:00 AM	26	18	10	12	10	8	5	3	6	0	3	3	1	2	2	5	0	1	1	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5
7:15 AM	24	17	17	11	14	8	6	5	0	0	3	2	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
7:30 AM	27	22	14	11	5	6	3	6	3	3	2	0	0	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	5
7:45 AM	31	26	11	10	13	6	1	5	7	3	4	1	2	0	0	0	0	2	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	7	2	9
8:00 AM	20	22	17	7	8	4	6	5	2	6	3	2	2	3	0	1	0	0	2	2	2	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	9
8:15 AM	27	15	15	11	3	11	5	5	2	2	3	1	5	2	2	0	2	1	1	1	3	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	13
8:30 AM	20	8	6	14	8	5	7	6	5	5	3	3	3	0	1	5	1	3	0	0	2	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0	14	7	21
8:45 AM	14	15	14	8	5	5	7	7	6	3	7	3	1	2	2	0	0	1	0	0	3	2	3	0	2	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	17	4	21
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	14	9	7	8	10	9	5	1	6	5	7	2	1	2	0	0	2	1	2	1	0	0	1	2	2	0	0	1	1	1	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	4	22	13	35
3:45 PM	15	13	16	6	7	9	4	4	4	5	2	2	1	2	3	2	3	2	2	1	0	1	0	4	2	3	1	1	0	0	1	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	4	29
4:00 PM	14	11	2	6	7	7	5	2	5	5	2	2	1	0	1	4	1	1	2	2	2	1	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	1	3	24	21	45
4:15 PM	9	10	10	8	8	6	8	3	6	2	1	1	5	1	1	2	2	1	2	2	1	0	1	1	0	1	1	2	1	0	0	2	0	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	24	9	33
4:30 PM	11	9	14	8	7	6	3	4	1	5	7	5	1	5	1	1	2	0	0	0	2	2	0	1	0	0	0	0	0	4	1	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	20	10	30
4:45 PM	13	12	8	10	6	3	4	6	5	1	4	6	2	2	1	3	2	2	3	4	1	0	1	2	0	2	1	2	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	26	7	33
5:00 PM	18	13	6	7	6	7	4	2	1	4	2	2	5	4	1	2	2	2	0	1	1	0	3	1	2	0	2	1	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	3	24	13	37
5:15 PM	15	13	5	9	9	5	7	8	7	3	1	2	4	2	6	1	3	0	1	1	1	2	1	0	1	1	1	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	7	24
5:30 PM	11	2	6	5	7	7	4	4	4	3	2	4	2	4	3	0	1	1	0	1	0	0	0	1	5	4	1	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0	0	0	0	23	11	34
5:45 PM	3	7	10	5	10	5	3	5	3	4	4	2	4	2	0	4	0	0	4	1	0	0	2	1	0	2	0	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	21	11	32
6:00 PM	6	6	6	6	3	0	5	3	2	4	1	3	0	0	5	3	1	1	3	1	2	3	0	1	0	1	0	1	0	0	0	1	0	2	0	0	0	2	0	0	0	0	0	1	0	1	0	1	1	1	0	28	24	52
6:15 PM	6	3	7	6	1	3	3	3	1	5	2	2	1	1	1	1	3	2	1	2	0	1	2	1	0	1	1	1	1	2	0	1	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0	29	24	53

A.M. Peak I 23
P.M. Peak I 141

APPENDIX

D WARRANT ANALYSIS

MI - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Brookside Blvd
Side Street (name)	Mollard Rd
Quadrant / Int #	
	CHECK SHEET

for Warrant Calculation Results, please hit 'Page Down'

Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	Existing Condition 2018

Road Authority:	MI
City:	Winnipeg
Analysis Date:	2018 Aug 02, Thu
Count Date:	2018 Apr 26, Thu
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Brookside Blvd	NB	0	1	0	0	1	0	n	1,640	2			
Brookside Blvd	SB	0	1	0	0	1	0	n	10,000	2			
Mollard Rd	WB	0	0	0	1	0	0	n	4,900	1			
Mollard Rd	EB	0	0	0	1	0	0	n	5,500	1			

Are the Mollard Rd WB right turns significantly impeded by through movements? (y/n)		n
Are the Mollard Rd EB right turns significantly impeded by through movements? (y/n)		n
Are the Brookside Blvd NB right turns significantly impeded by through movements? (y/n)		n
Are the Brookside Blvd SB right turns significantly impeded by through movements? (y/n)		n

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

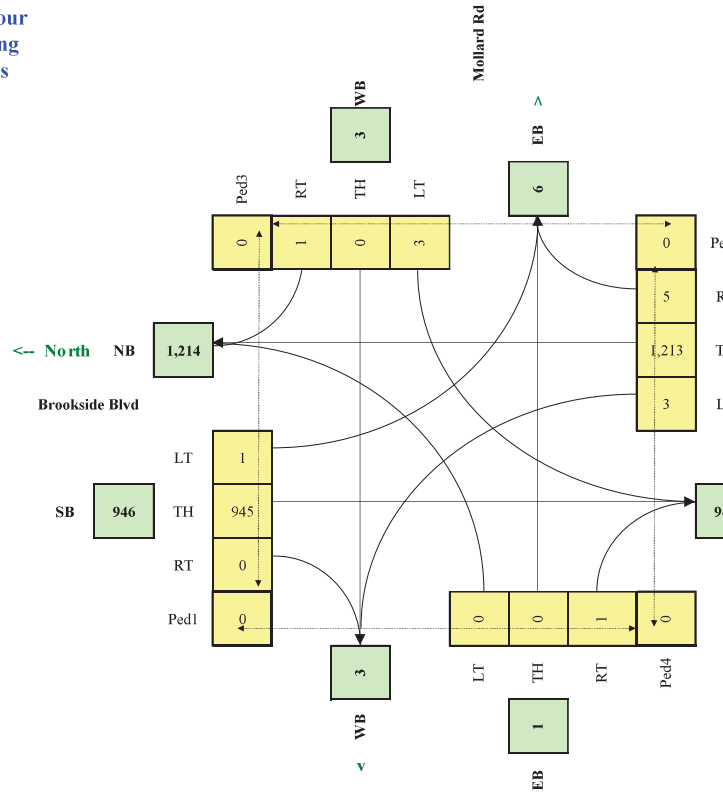
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	750,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Brookside Blvd	NS	100	6.0%	n	8.0
Mollard Rd	EW	90	2.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	0	520	5	5	1975	0	5	0	5	0	0	0	0	0	0	0
	0	590	0	0	1255	0	0	0	0	0	0	0	0	0	0	0
	5	1085	5	0	390	0	0	0	0	0	0	0	0	0	0	0
	5	1595	5	0	575	0	0	0	0	0	0	0	0	0	0	0
	5	2020	10	0	730	0	5	0	0	0	0	0	0	0	0	0
	0	1470	5	0	745	0	5	0	0	0	0	5	0	0	0	0
Total (6-hour peak)	15	7,280	30	5	5,670	0	15	0	5	0	0	5	0	0	0	0
Average (6-hour peak)	3	1,213	5	1	945	0	3	0	1	0	0	1	0	0	0	0
										Actual Pedestrian Crossing Distance (m)						

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$

W =	6	6	0
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

MI - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Brookside Blvd
Side Street (name)	Mollard Rd
Quadrant / Int #	
	CHECK SHEET
for Warrant Calculation Results, please hit 'Page Down'	

Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	Background 2019

Road Authority:	MI
City:	Winnipeg
Analysis Date:	2018 Aug 02, Thu
Count Date:	2018 Apr 26, Thu
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Brookside Blvd	NB	0	1	0	0	1	0	n	1,640	2			
Brookside Blvd	SB	0	1	0	0	1	0	n	10,000	2			
Mollard Rd	WB	0	0	0	1	0	0	n	4,900	1			
Mollard Rd	EB	0	0	0	1	0	0	n	5,500	1			

Are the Mollard Rd WB right turns significantly impeded by through movements? (y/n)	n
Are the Mollard Rd EB right turns significantly impeded by through movements? (y/n)	n
Are the Brookside Blvd NB right turns significantly impeded by through movements? (y/n)	n
Are the Brookside Blvd SB right turns significantly impeded by through movements? (y/n)	n

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

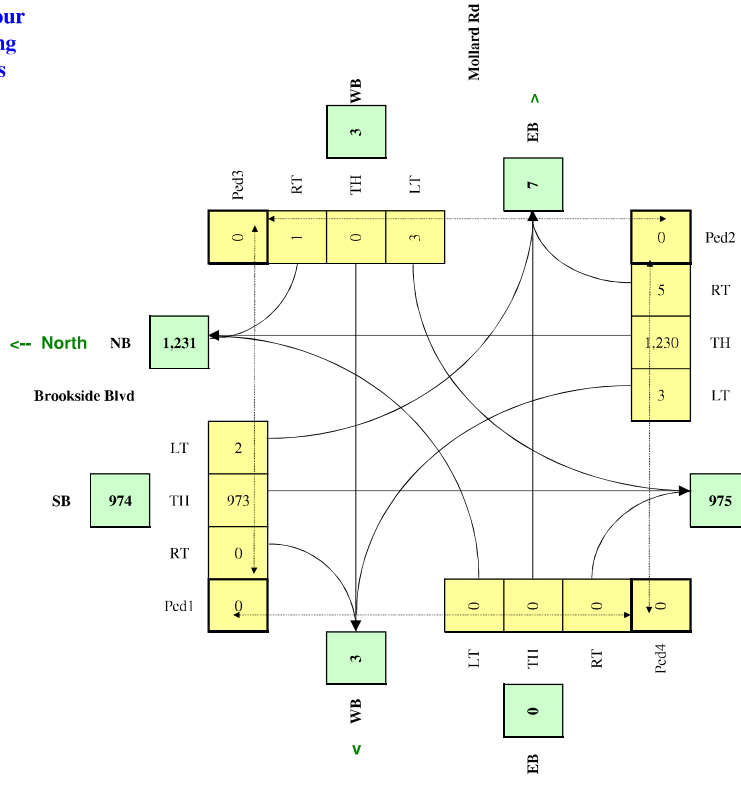
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	750,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Brookside Blvd	NS	100	6.0%	n	8.0
Mollard Rd	EW	90	2.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	0	530	5	5	2015	0	5	0	5	0	0	0	0	0	0	0
	0	390	0	5	1490	0	5	0	0	0	0	0	0	0	0	0
	5	1110	5	0	400	0	0	0	0	0	0	0	0	0	0	0
	5	1625	5	0	585	0	0	0	0	0	0	0	0	0	0	0
	5	2060	10	0	745	0	5	0	0	0	0	0	0	0	0	0
	5	1665	5	0	600	0	0	0	0	0	0	0	0	0	0	0
Total (6-hour peak)	20	7,380	30	10	5,835	0	15	0	5	0	0	0	0	0	0	0
Average (6-hour peak)	3	1,230	5	2	973	0	3	0	1	0	0	0	0	0	0	0
													Actual Pedestrian Crossing Distance (m)			

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F (X_{v\text{-}p}) L) / K_2] \times C_i$

W = 7 (Veh) 7 (Ped) 0

Not Warranted - Vs<75

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

MI - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Brookside Blvd
Side Street (name)	Mollard Rd
Quadrant / Int #	
Comments	Post Development 2019
Direction (EW or NS)	NS
Direction (EW or NS)	EW
Road Authority:	MI
City:	Winnipeg
Analysis Date:	2018 Jul 26, Thu
Count Date:	2018 Apr 26, Thu
Date Entry Format:	(yyyy-mm-dd)

CHECK SHEET

for Warrant Calculation Results, please hit 'Page Down'

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Brookside Blvd	NB	0	1	0	0	1	0	n	1,640	2			
Brookside Blvd	SB	0	1	0	0	1	0	n	10,000	2			
Mollard Rd	WB	0	0	0	1	0	0	n	4,900	1			
Mollard Rd	EB	0	0	0	1	0	0	n	5,500	1			

Are the Mollard Rd WB right turns significantly impeded by through movements? (y/n)	n
Are the Mollard Rd EB right turns significantly impeded by through movements? (y/n)	n
Are the Brookside Blvd NB right turns significantly impeded by through movements? (y/n)	n
Are the Brookside Blvd SB right turns significantly impeded by through movements? (y/n)	n

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

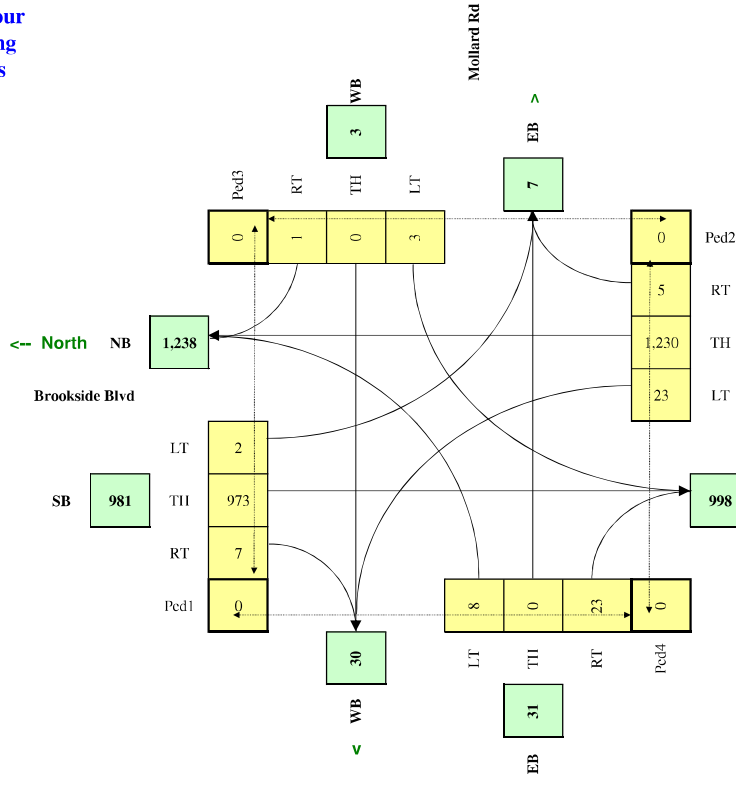
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	750,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Brookside Blvd	NS	100	6.0%	n	8.0
Mollard Rd	EW	90	15.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	30	530	5	5	2015	10	5	0	5	5	0	25	0	0	0	0
	20	390	0	5	1490	10	5	0	0	5	0	20	0	0	0	0
	15	1110	5	0	400	5	0	0	0	5	0	15	0	0	0	0
	20	1625	5	0	585	5	0	0	0	10	0	25	0	0	0	0
	30	2060	10	0	745	5	5	0	0	10	0	30	0	0	0	0
	25	1665	5	0	600	5	0	0	0	10	0	25	0	0	0	0
Total (6-hour peak)	140	7,380	30	10	5,835	40	15	0	5	45	0	140	0	0	0	0
Average (6-hour peak)	23	1,230	5	2	973	7	3	0	1	8	0	23	0	0	0	0
Actual Pedestrian Crossing Distance (m)																

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F (X_{v\text{-}p}) L) / K_2] \times C_i$

W = 35 35 0

Veh Ped

Not Warranted - Vs<75

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

MI - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Brookside Blvd	Direction (EW or NS)	NS	Road Authority:	MI
Side Street (name)	Mollard Rd	Direction (EW or NS)	EW	City:	Winnipeg
Quadrant / Int #		Comments	Post Background 2029	Analysis Date:	2018 Aug 02, Thu
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	2018 Apr 26, Thu
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Brookside Blvd	NB	0	1	0	0	1	0	n	1,640	2			
Brookside Blvd	SB	0	1	0	0	1	0	n	10,000	2			
Mollard Rd	WB	0	0	0	1	0	0	n	4,900	1			
Mollard Rd	EB	0	0	0	1	0	0	n	5,500	1			

Are the Mollard Rd WB right turns significantly impeded by through movements? (y/n)	n
Are the Mollard Rd EB right turns significantly impeded by through movements? (y/n)	n
Are the Brookside Blvd NB right turns significantly impeded by through movements? (y/n)	n
Are the Brookside Blvd SB right turns significantly impeded by through movements? (y/n)	n

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

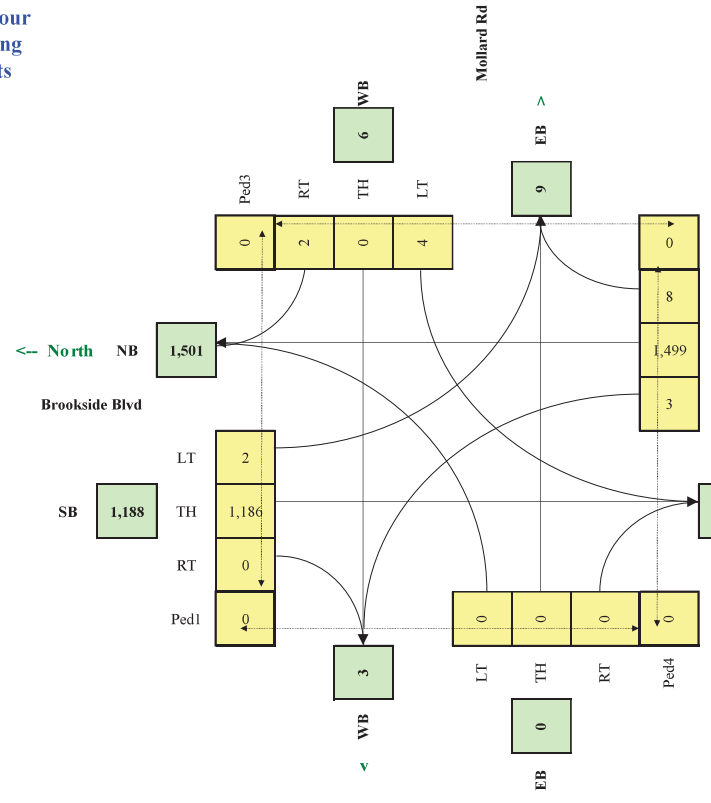
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	750,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Brookside Blvd	NS	100	6.0%	n	8.0
Mollard Rd	EW	90	2.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	0	645	5	5	2455	0	5	0	5	0	0	0	0	0	0	0
	0	480	5	5	1815	0	5	0	5	0	0	0	0	0	0	0
	5	1350	5	0	490	0	0	0	0	0	0	0	0	0	0	0
	5	1980	10	0	715	0	5	0	0	0	0	0	0	0	0	0
	5	2510	10	0	905	0	5	0	0	0	0	0	0	0	0	0
	5	2030	10	0	735	0	5	0	0	0	0	0	0	0	0	0
Total (6-hour peak)	20	8,995	45	10	7,115	0	25	0	10	0	0	0	0	0	0	0
Average (6-hour peak)	3	1,499	8	2	1,186	0	4	0	2	0	0	0	0	0	0	0
Actual Pedestrian Crossing Distance (m)																

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$

W =	11	11	0
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

MI - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Brookside Blvd
Side Street (name)	Mollard Rd
Quadrant / Int #	
	CHECK SHEET
for Warrant Calculation Results, please hit 'Page Down'	
Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	Post Development 2029
Road Authority:	MI
City:	Winnipeg
Analysis Date:	2018 Jul 26, Thu
Count Date:	2018 Apr 26, Thu
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Brookside Blvd	NB	0	1	0	0	1	0	n	1,640	2			
Brookside Blvd	SB	0	1	0	0	1	0	n	10,000	2			
Mollard Rd	WB	0	0	0	1	0	0	n	4,900	1			
Mollard Rd	EB	0	0	0	1	0	0	n	5,500	1			

Are the Mollard Rd WB right turns significantly impeded by through movements? (y/n)	n
Are the Mollard Rd EB right turns significantly impeded by through movements? (y/n)	n
Are the Brookside Blvd NB right turns significantly impeded by through movements? (y/n)	n
Are the Brookside Blvd SB right turns significantly impeded by through movements? (y/n)	n

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

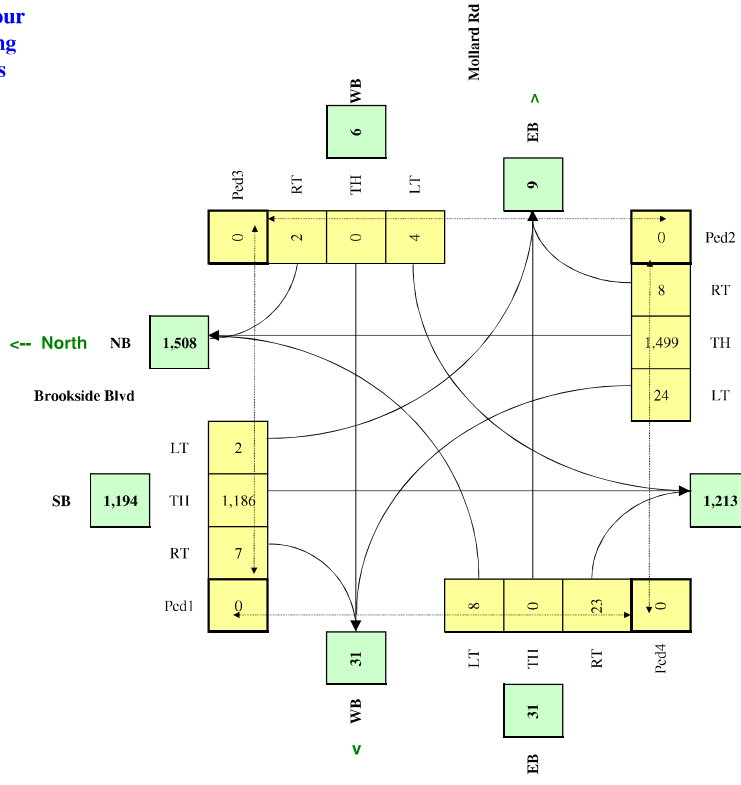
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	750,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Brookside Blvd	NS	100	6.0%	n	8.0
Mollard Rd	EW	90	15.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	30	645	5	5	2455	10	5	0	5	5	0	25	0	0	0	0
	20	480	5	5	1815	10	5	0	5	5	0	20	0	0	0	0
	15	1350	5	0	490	5	0	0	0	5	0	15	0	0	0	0
	25	1980	10	0	715	5	5	0	0	10	0	25	0	0	0	0
	30	2510	10	0	905	5	5	0	0	10	0	30	0	0	0	0
	25	2030	10	0	735	5	5	0	0	10	0	25	0	0	0	0
Total (6-hour peak)	145	8,995	45	10	7,115	40	25	0	10	45	0	140	0	0	0	0
Average (6-hour peak)	24	1,499	8	2	1,186	7	4	0	2	8	0	23	0	0	0	0
													Actual Pedestrian Crossing Distance (m)			

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F (X_{v\text{-}p}) L) / K_2] \times C_i$

W =	48	48	0
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

TRANSPORTATION PLAN
in SATISFACTION of RURAL MUNICIPALITY of ROSSER QUARRY OPERATION BY-LAW NO. 8-15

SUBMITTED TO:

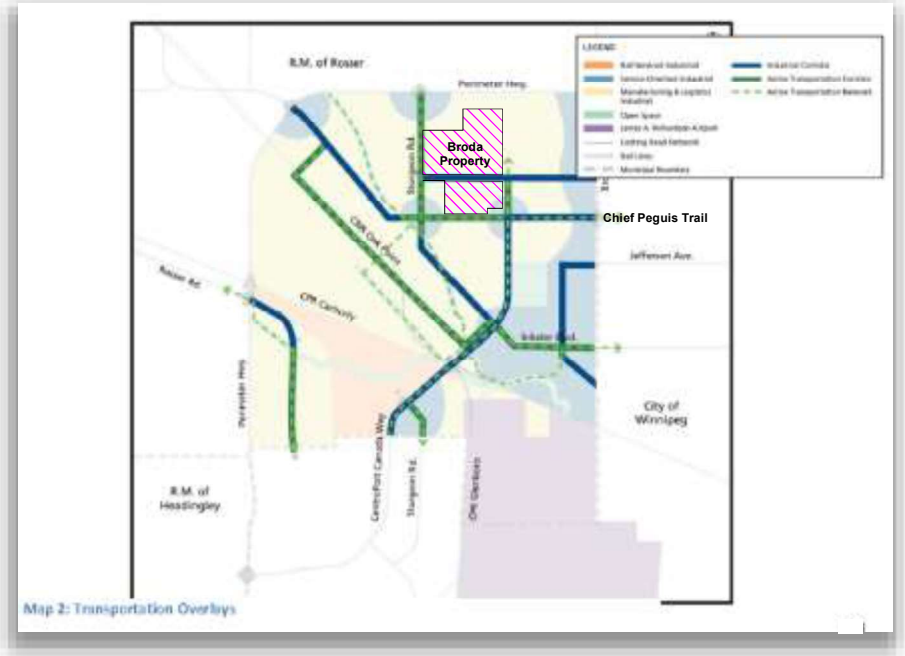
Manitoba Infrastructure
Engineering and Operations Division

SUBMITTED BY:

North Perimeter Aggregates Inc.
Broda Properties Inc.

PREPARED BY:

MLi3 Inc.



January 22, 2019

ACKNOWLEDGEMENTS

MLi3 Inc. acknowledges with gratitude the guidance and suggestions received from government representatives who offered input into the development of the Plan. Further, gratitude is expressed for the guidance and suggestions offered by neighbouring landowners who voluntarily participated in the 2008-2009 Citizens Advisory Committee process to constructively critique (i) Broda's design of the evolving project, and (ii) Tetr*ES* Consultants Inc.'s Environmental Impact Assessment of the then-current project. We especially acknowledge representatives from Manitoba Infrastructure (Highways Department) who provided guidance or input into the development of this Plan, most recently in the meeting of December 18, 2017. Independent 3rd Party Peer Review by a former Deputy Minister, Manitoba Conservation, is also acknowledged with much appreciation. Relevant information prepared by DST Consulting Engineers Inc., WSP Engineering and HCG Engineering is acknowledged with appreciation.

STUDY TEAM

Mike McKernan	Environmental Scientist; Principal in Charge
Mike Sweet	Environmental Scientist
Richard Bruneau	Researcher; Information Management Specialist
Anna Morrison	Researcher, Document Production and QA

DISCLAIMER

MLi3 Inc. accepts no responsibility for damages of any kind, if any, suffered by any third party because of a of decisions made or actions based on this Transportation Plan ("this report"). All conclusions, views and opinions expressed in this report are those of MLi3 Inc.

USE OF THIS REPORT:

This report has been prepared for the sole benefit of Broda Properties Inc. ("Broda", or "the Client" or its agent) and may not be used by any third party without the express written consent of MLi3 Inc. and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT:

The information, opinions, and/or recommendations made in this report are in accordance with MLi3 Inc.'s present understanding of the Client's site(s) and/or the project(s) and/or actions referenced herein. If the proposed site-specific locations, site uses, actions and/or project(s) differ(s) or is/are modified from what is described in this plan, or if the site conditions as described herein are altered, this report is no longer valid unless MLi3 Inc. is requested by the Client to review and revise the report to reflect the differing or modified location, land use, action and/or project specifics and/or the altered site condition(s).

STANDARD OF CARE:

Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in Manitoba for the specific professional service provided for the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS:

All site-specific descriptions, and statements regarding their influence on the findings and recommendations made in this report, are based on site conditions encountered byMLi3 Inc. at the time of its site-specific work and at the specific testing and/or sampling locations on the Client's property(s) examined by either Tetr*ES* Consultants Inc. or Stantec Consulting Ltd. by whom two of this report authors (JMM, MJS) were employed over the periods, respectively, of 1990-2010 and 2010-2015.Environmental descriptions and other classifications and/or statements of site condition(s) have been made in accordance with normally accepted professional practices which are judgmental in nature; no specific description in this report should be considered exact, but rather to be reflective of the anticipated behaviour of the material or matrix in question. Extrapolation of *in situ* conditions can be made only to some limited extent beyond the understandings set out herein, being in turn based on specific localized sampling or test points. The extent depends on variability of the soil, rock, groundwater conditions, species composition, habitat types, habitat uses, etc., as influenced by geological processes, time, seasons, planned construction activity, and intended site use(s).

VARYING OR UNEXPECTED CONDITIONS:

Should any site or subsurface condition(s) be encountered in the future, if the proposed land use or project proceeds, that are different from those described in this report or encountered at the test locations referenced herein, MLi3 Inc. must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required.MLi3 Inc. will not be responsible to any party for damages incurred because of that party failing to notify MLi3 that differing site or sub-surface condition(s) are present upon becoming aware of such conditions.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 INTENT TO DEVELOP HIGH-QUALITY AGGREGATE QUARRY

Broda Properties Inc. (operating in Manitoba as "North Perimeter Aggregates Inc.") has been working to develop a high-quality aggregate-supply business on the property it owns in the Rural Municipality (RM) of Rosser (Figure 1-1). The site is approximately 589 acres on lands in Section 4, Township 12, Range 2, EPM, and Section 33, Township 11, Range 2 EPM, bisected by Mollard Road. All project land is held by Broda.

The proposed multi-stage development is located close to and west of the intersection of Mollard Road and Metro Route 90, immediately west of Klimpke Road, ~3 km (~2 miles) southeast of the intersection of the Perimeter Highway (Provincial Trunk Highway [PTH] 101) and PTH 7 (Figure 1-1).

Figure 1-1. Development is located 1-2 miles south of Perimeter Highway, west of intersection of Mollard Road and Metro Route 90, between Sturgeon Rd (west), Klimpke Rd. (east). Sources: Google Earth, KGS Group 2010, Tetr*ES* Consultants Inc. 2010.

The proposed operation is not a use that was permitted under the former land-use planning and administration scheme that applied to the lands before creation of CentrePort in 2008. The property is zoned for agriculture, the prevailing local land use (Figure 1-2). (The prevalence of the agricultural land use is evident in digital imagery routinely captured by satellites [Figure 1-3])

Figure 1-2. The development is planned for land now zoned and used for agriculture south of Perimeter Highway, west of Metro Route 90. Source: Google Earth, MLi3 Inc.

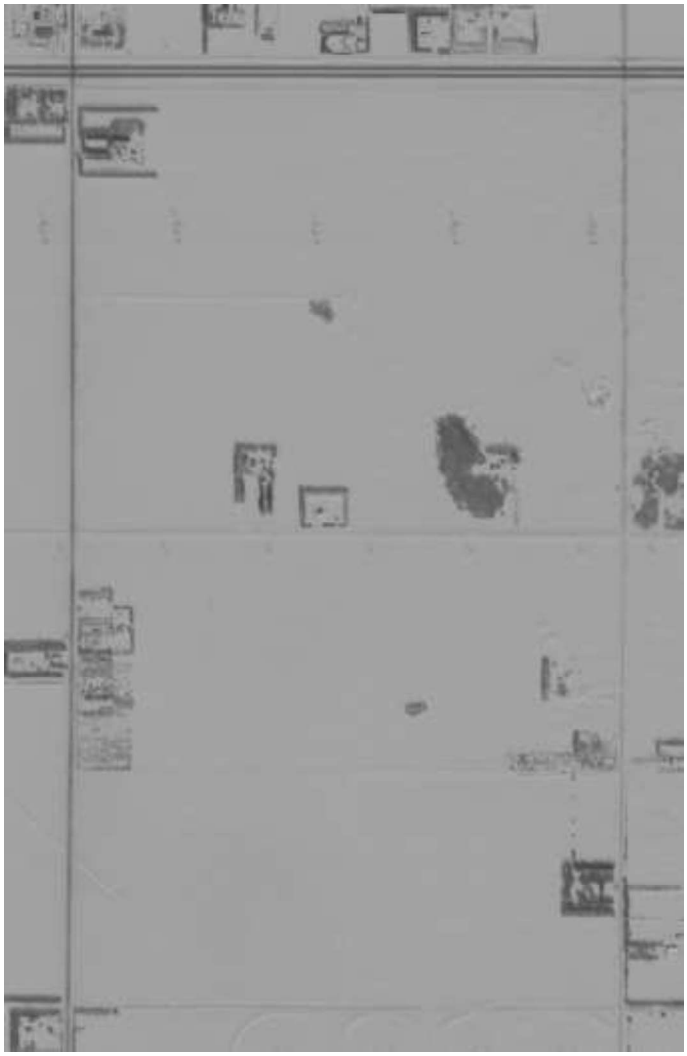


Figure 1-3. Prevalence of agriculture is reflected in unsupervised classification mapping of grey-toned "spectral signature" for cropland in recent satellite image. Darker polygons are shelterbelts, woodlots, houses, machine sheds, etc. Source: Google Earth, MLi3 Inc.

Accordingly, to support applications for Conditional Approval by the RM and the South Interlake Planning Board (SIPD) of the proposed new land use, Broda worked for several years with the information and guidance from a Citizens Advisory Committee (CAC) of neighbouring landowners. This Committee collaborated briefly with Broda in 2005-2006 to help plan a project where all possible potential impacts could be identified, assessed and precluded. This was then expected to occur through a combination of careful project development and impact mitigation, ongoing environmental monitoring, and ongoing collaboration with the CAC.

The proactivity of Broda's approach and the very high level of corporate commitments to the highest standards of possible environmental and socioeconomic care notwithstanding, several applications for the requested change in land-use zoning over many years were rejected by Rosser Council (and, accordingly, SIPD). Broda has, nonetheless, continued to believe in the

intrinsic value of the project. Broda continues to believe that there was, and is, significant growing economic need and opportunity.

Broda has therefore continued to invest in building the knowledge necessary to develop the site in a sensitive fashion, consistent with the state-of-the-art in limestone quarry development and operations.

Recent (2016) changes in the planning processes applying to the lands within the CentrePort Special Planning Area (SPA) acknowledge that quarries should be a "permitted use". This intent is consistent with the Inland Port SPA Regulation 48/2016, specifically its Aggregate Policy 6.1.2.3. This Policy notes that in "an area designated by the appropriate provincial authority as having 'high' or 'medium' mineral content must have the mineral extracted prior to it being developed for other uses, unless otherwise approved by the authority". The Broda property is located above the last undeveloped provincially-designated 'High Quality" limestone ore body (Figure 1-4; Baracos 1983). Recovering these high-value construction materials can reduce the costs of infrastructure construction in the Winnipeg-centred region, improving all regional construction-project economics.

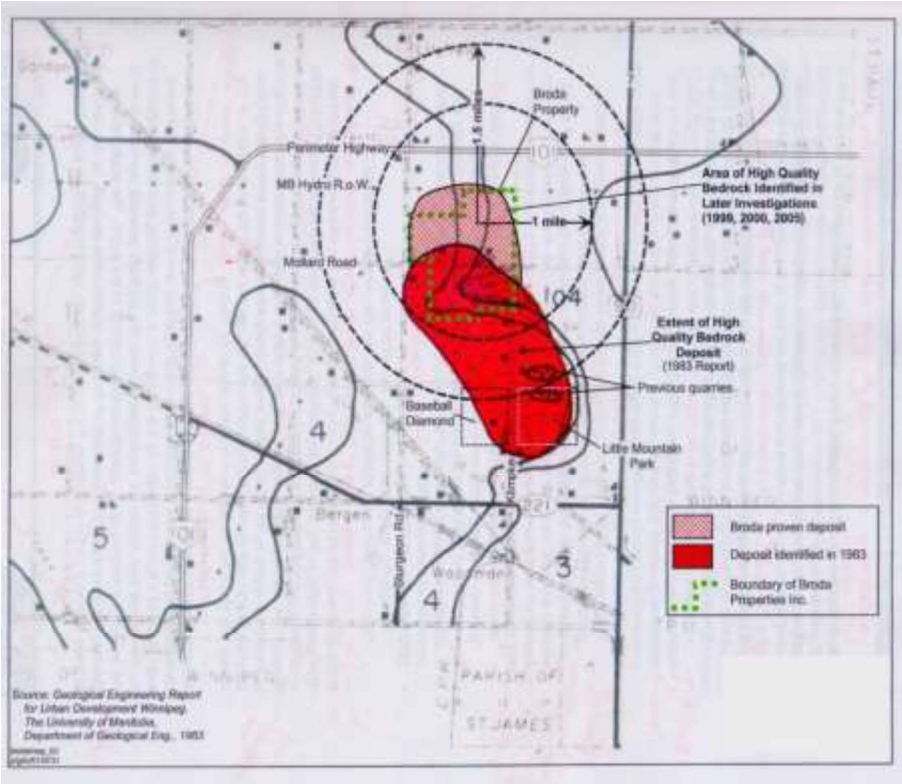


Figure 1-4. Development is located above the last undeveloped provincially-designated 'High Quality" limestone-ore body. Deposits under Broda land have variable surficial topography, and are northern continuity of a geological formation trending to southeast, previous excavated and redeveloped as community athletic amenity for public recreation. Sources: Google Earth, KGS Group 2010, Tetr*ES* Consultants Inc. 2010.

To be developed in five stages, the highest concentration of the highest-value materials located generally north of Mollard Rd., will be quarried first (Figure 1-5). This first few stages of the project development are often termed "Stage 1" throughout this report (and in related documents prepared by MLi3 for Broda). Little Mountain Park's baseball diamonds are

immediately south of the property (Figure 1-4) and right beside land quarried for mining of aggregate materials in previous years from the southerly extension of the same geological formation.

Figure 1-5. Initial development stages will address variable elevations and thicknesses of last undeveloped provincially-designated 'High Quality" limestone-ore body. Shape of complete excavation is nominal; i.e., expected but not certain. Shape will depend on field conditions. Sources: Google Earth, KGS Group 2010, Tetr*ES* Consultants Inc. 2010

1.2 PROVINCIAL REGULATORY GUIDANCE FOR QUARRY DEVELOPMENT

The *CentrePort Act*, assented to on October 9, 2008, mandates the creation of an "inland port" to encourage transportation, warehousing, trade, manufacturing, and distribution throughout Manitoba, but especially in proximity to the James Armstrong Richardson International Airport. The province initiated a process to create a "Manitoba Development Plan for CentrePort Lands", which included public, multi-stakeholder liaison, and consultations. The resulting planning scheme for the CentrePort land base proposed an enhanced future for the 20,000 acres within the Perimeter Highway considered necessary for the Project (MMM Group 2009). About 54% of the CentrePort lands fall within the RM of Rosser.

The Province has authority to ensure that quarries developed on Crown lands satisfy the stringent requirements for Environmental and Community Interests Protection under the *Mines and Minerals Act*. The planning, operations-related monitoring, and decommissioning requirements set out under The *Quarry Minerals Regulation* (QMR; MR 65/92) amplify these protections. They do so in the form of specific prescriptions for beneficial action, and against

specific unwanted action. These prescriptions apply strictly to projects proposed on Crown lands. Their protective value, however, means that they are often applied to various processes for permitting, or to approvals, for private-land development. One example would be decisions by municipalities to add these QMR prescriptions as conditions for the Conditional Use Approval (CUA) that Broda has sought for the site. Clause 43(1)(b)(ii) of the QMR requires minimum separation/setback distance of 400 m between any rural residence and the aggregate-mining boundary. Most rural municipalities regulating aggregate operations use this setback distance as a condition in a CUA decision to create a "buffer zone". Another example would be decisions by Manitoba Sustainable Development to include several of these QMR prescriptions as conditions if a license were to be issued under *The Environment Act*.
There are less formal, more discretionary, forms of provincial guidance to support quarry developers in planning their proposed developments. An example is selection of site access/egress that Manitoba Infrastructure (MI, formerly MIT) would prefer or could accept. During consultations on February 3, 2010, with MIT, it advised that it would not allow direct access to the Perimeter Highway (PTH 101) by quarry vehicles, notwithstanding Broda's request to do so (and the basis for it). At a meeting convened on December 18, 2017, this preference was reiterated by MI.

1.3 GUIDANCE FOR QUARRY DEVELOPMENT ON CENTREPORT LANDS

The *Inland Port SPA Planning Regulation MR 48/2016* allows a quarry as a permitted land use within the Heavy Industrial Zone (Class 3; "I3"), on the CentrePort lands within Rosser. Approval of a proposed quarry, pursuant to rezoning recommendations of the Inland Port SPA Planning Authority Board (SPAB) which has jurisdiction over these lands, must be made by the Minister of Indigenous and Municipal Relations. The Minister's decision can occur only after a public review of the proposal, including a public hearing administered by the SPAB.

1.4 R.M. OF ROSSER QUARRY OPERATIONS BY-LAW

In addition to these levels of environmental and community protection, including the requirements for a public hearing, and a review and issuance of approval conditions by an independent Planning Board that it co-chairs, Rosser has created a special By-law ("Quarry Operations By-Law"; Rosser By-law No. 8-15; a.k.a. the "Aggregate By-law") to create further control over such aggregate operations.

1.4.1 Assessment and Plans Required by Quarry-Operations By-law

As one type of control measure included in the Aggregate By-law, the By-law sets out requirements for several formal Assessments and Plans that must be reviewed and approved by Rosser. As prescribed in the By-law, set out in Clause 13 and in Schedule A, (and along with other Plans that Broda will prepare to satisfy various other requirements; e.g., MLi3 2019f), these specific Plans include the following:

- Adaptive Management Plan (submitted as the Adaptive Management and Progressive Rehabilitation Plan; ["AMPRP"]; MLi3 2019a)
- Progressive Rehabilitation Plan (subsumed within the AMPRP; MLi3 2019a)
- Sound Impact Assessment (submitted as the Sound Impact Management Plan and Sound Impact Assessment; ["SIMPSIA"]; MLi3 2019b)
- Transportation Plan (MLi3 2019c)
- Visual Impact Assessment (submitted as the Visual Impact Management Plan and Visual Impact Assessment; ["VIMPVIA"]; MLi3 2019d)
- Water and Natural Resources Management Plan (MLi3 2019e)
- Preliminary Environmental Monitoring Plan (MLi3 Inc. 2019f, in prep)
- Rosser Quarry Conceptual Operating Plan. WSP Engineering (WSP Canada Group Limited). 2019 (confidential; in prep)
- Proposed Limestone Quarry in The RM of Rosser Traffic Impact Study. WSP Engineering (WSP Canada Group Limited). 2018
- DST Consulting Engineers Inc. 2018. Blast Impact Assessment – Proposed North Perimeter Aggregates Quarry, Rural Municipality of Rosser, Province of Manitoba. Final report to Broda Properties Inc. October 25, 2018. Sudbury

Broda has instructed MLi3 Inc. of Winnipeg to develop these documents (and review those prepared by others) to support its application for rezoning of its property within the RM of Rosser. The MLi3 Inc. documents have been considered, adopted and committed to by Broda (Broda *pers. comm.* 2018). All the documents will be formally filed in support of Broda's formal request to the SPAB for rezoning of its property.

2.0 PURPOSE

This Transportation Plan is one of several foundation-support documents (MLi3 2019a,b,d,e,f) underpinning and supporting the preliminary Operating Plan, the preliminary site layout, the Site Rehabilitation Plan (SRP) and the Site End Use Plan (SEUP) that Broda will: (i) develop through dialogue with the RM and Manitoba Mines Branch (MMB), (ii) file for formal approval by the MMB, and (iii) use to support negotiation of a Development Agreement with the RM. The Plan will demonstrate satisfaction of previous corporate commitments to prevent or mitigate off-site visual impacts made to: (i) the CAC, (ii) participants at several public Open Houses and RM of Rosser public hearings about the proposed project, (iii) directly and personally to several neighbour landowners adjoining the Broda property (there are three homes within ~0.8 km of the current planned quarry), (iv) MMB, and (v) MI. It embodies the "state of the art" in progressive management of a quarry during its operational phase and to guide the planning for transition to an end use(s) desired by a reactivated Citizens Advisory Committee and the site's neighbours and the elected officials of the RM. Its submission is to demonstrate Broda's partial completion to date, and intention to complete, all relevant portions of Rosser Bylaw 8-15 applicable to Broda's proposed high-quality aggregate quarry in the RM of Rosser. Its development and execution is also to demonstrate satisfaction of the requirements set out in or under *The Special Planning Area Regulation* 49/2016 and the *Inland Port SPA Planning Regulation* No. 48/2016 that, taken together, allow a quarry as a permitted land use within the Heavy Industrial Zone (Class 3; "I3") on the CentrePort land base.

This Transportation Plan draws from Broda's prior examinations of this subject. These occurred in prior public-review processes administered under *The Planning Act*. The most recent filing of information assessing the potential for the proposed project to create impacts on the visual environment occurred in 2010 (Tetr*ES* Consultants Inc. 2010). This filing supported a Condition Use Approval application by Broda Properties to the RM of Rosser and the SIPD. The "Traffic Impact Study" recently completed for Broda (WSP Engineering 2018) has provided helpful new content to strengthen the plan, while satisfying a condition of Bylaw 8-15).

This document is the "Transportation Plan" required in By-law 8-15, Schedule A. As such, it is one of the pillars underpinning Broda's general corporate plan to preclude or mitigate impacts from its proposed project. The impact-prevention and -mitigation components of this Plan embody the 'state of the art' in proactive management of a modern, well-operated quarry and reflect consideration of the recommendations in the WSP "Traffic Impact Study". They are intended to help develop and maintain strong positive relations with Manitoba Infrastructure and Transportation and the site's neighbours. With further respect to requirements of Bylaw 8-15, this Plan has been prepared and adopted by Broda Properties to satisfy the Rosser Secondary Plan, another requirement of the Bylaw.

3.0 COLLABORATION

The development of this Transportation Plan has benefitted from guidance, suggestions and thoughtful commentary received from many provincial staff having responsibilities in jurisdictions duplicated by Rosser's By-law 8-15. These Departments or Branches include those noted below. The text below also sets out some of the issues, concerns or planning requirements in these collaborative jurisdictions that this Plan seeks to address:

- Community and Regional Planning Branch and MMB (satisfaction of requirements for buffer zones to create setback distances from homes).
- MI (selection of site access from Brookside Blvd.; possible need for improvements at intersection of Mollard Road and Route 90; recommendations from a "Traffic Impact Study").

In addition to collaboration with regulatory and other government departments, Broda will maintain a collaborative approach with its neighbours. Broda intends to reactivate and maintain collaborative dialogue with a Citizens Advisory Committee (CAC) that Broda created in 2005. Broda supported several meetings with the CAC through 2006 to explore its needs for information and input to project planning until Committee members saw no further value in participation (after the project was last rejected by Rosser Council) in 2010. New participants in the Committee will be sought to augment the core of members willing to maintain their participation from the earlier years. The previous corporate mechanisms for public accountability will be strengthened with new digital techniques. These will provide for public input to and surveillance of quarry operations, and new techniques (e.g., interactive website) for public and regulatory accountability. Management of potential site-transportation impacts will be a priority for attention in the dialogue process. So too will dialogue with the neighbours about using site layout and equipment to preclude or minimize off-site transportation-related nuisance. These measures may not, even collectively, be sufficient however to prevent trucking-proximity nuisance to the site's few neighbours.

4.0 PERFORMANCE OBJECTIVES

The text below sets out qualitative performance objectives and, where applicable and possible, measurable performance metrics established by Broda, to satisfy the relevant requirements of the various regulatory and planning regimes and jurisdictions in developing this Transportation Plan. These objectives can be used by any party to determine whether the Transportation Plan is working, and having the desired effect(s). The performance objectives and /or metrics are:

- Developing and securing MMB endorsement of a conceptual SEUP and SRP (that include commitments to visual-impact prevention) submitted to MMB after receiving approval of the requested zoning change. This would satisfy the intent of Clause 188(1) of the *Mines and Minerals Act*.

- Stockpiling and using site-sourced non-marketable materials, and clean off-site soils, for constructing berms planted with fast-growing native vegetation to create seasonal and annual visual and sonic screening of all site transportation-related activities.

- Adapting, creating and implementing Standard Operating Procedures (SOPs) and a site-specific Operating Plan requiring excavation by a Continuous Surface Miner of a progressively moving 'open face' of the pit as the quarry operation progresses across the site, with as much operating machinery as possible placed at the trench invert (bottom elevation), to reduce visibility of and sound propagation from on-site truck-filling and access/egress operations.

- Returning the site to agricultural, recreational or other use, consistent with the CentrePort planning regime and/or the proposed final land use desired by the RM, to maximize the visual consistency of the site with the ambient environment.

- Satisfying concerns and responding effectively to CAC suggestions for improvements in transportation management.

- Satisfying recommendations of the Traffic Impact Study (WSP Engineering 2018).

These performance goals and metrics are planned to be met in the following ways.

4.1 REGULATORY COMPLIANCE

MI's typical transportation responsibilities include corporate policy and provincial legislation development, motor-carrier safety, regulation enforcement, carrier permits, and development and implementation of sustainable transportation initiatives. The Department's safety guidelines must be adhered to when planning any project that involves increasing vehicular traffic loads.

4.1.1 Programmatic Regulations and Certification Requirements

The Department has various programs and services that address Motor Carrier Safety, including:

- The Heavy Vehicle Safety Initiative - Safety Fitness Program Expansion
- Commercial Operator Regulatory Education Pac
- Carrier Snapshot Compliance Information and Safety Rating
- The Carrier Profile System
- *Motor Carrier Safety Fitness Criteria and Certificates Regulation*
- *The Highway Traffic Amendment Act* (Enhanced Safety Regulation of Heavy Motor Vehicles)
- Safety Fitness Certificates
- General Guidelines for the Preparation of Traffic Impact Studies.

Broda has committed to ensure that any company traveling to and/or hauling aggregate from the quarry must comply with all applicable certifications and regulations required by MI. Broda has completed the "Traffic Impact Study" required by By-Law 8-15 according to MI's General Guidelines for the preparation of such studies (WSP Engineering 2018).

Manitoba Workplace Safety and Health is responsible for keeping Manitoba's workers safe on the job. The Safe Work Manitoba program provides information that pertains to ensuring worker safety in the Mining and the Transportation industries. Both these areas are applicable to the Broda Quarry operations. Broda advises that it has committed to ensure that all its transportation operations will comply with the Safe Work Manitoba program and all applicable requirements of Manitoba Workplace Safety and Health.

4.1.2 Programmatic Load-Restriction Requirements

The TransCanada Highway is classified as a Roads and Transportation Association of Canada (RTAC) route in the *Vehicle Weights and Dimensions on Classes of Highways Regulation* (MR 575/88). Provincial Trunk Highways (PTH) 7 and 6 are designated as RTAC routes. Maintenance of both highways falls under the jurisdiction of the Province, and neither have seasonal loading (weight) restrictions.

Provincial Roads 221, 236, and 321 are designated Class B1 except for:

- The portion of 221 from the point 1.8 km west of PTH #101 easterly to the City of Winnipeg boundary where it is designated as an "RTAC route".
- The portion of 236 from its junction with PTH #6 northwesterly for 1 km where it is designated "Class A1".

Where PR 221 and 236 leave PTH 101, heading northwest and north, both are subject to Level 1 Restrictions, effective from March 18 (Manitoba Transportation and Government Services 2007). These Restrictions require a reduction to 90% of normal loading. Soon after PR 221 passes across the Regional Boundary (at Rosser), and where PR 236 intersects PR 321, both highways become subject to a Level 2 Restriction, which requires a reduction to 65% of normal loading. The section of PR 236 running between PTH 6 and PR 221 is gravel and allows unrestricted seasonal travel. There are no seasonal weight restrictions on unpaved roads in the area surrounding the Project site. Broda has committed to ensure that trucks traveling to and from its site observe and fully comply with any RM-mandated seasonal load restrictions.

4.2 MEETING BEST PRACTICES IN TRANSPORTATION PLANNING

To meet 'Best Practices' in Transportation Planning, Broda has:

- Prepared a Transportation Plan consistent with regulatory requirements and advice that (i) assessed the potential for the proposed project to create unmitigated transportation-related impacts upon the ambient socioeconomic environment, especially close to the site and its few neighbours (i.e., one closest to the site-access point); and (ii) considered the best means possible for preventing, minimizing and mitigating the potential for significant transportation impacts.
- Collaborated with MI, MMB and the CAC in building the key elements of the Plan to prevent, minimize or mitigate impacts through; (i) the conceptual site layout (WSP Engineering 2019 in prep.), which will be further refined through dialogue; (ii) Broda's Standard Operating Procedures (which are generic), and (iii) the site Conceptual Operating Plan (WSP Engineering 2019; confidential, in prep.), which when fully refined and articulated will be site-specific).
- Completed the "Traffic Impact Study" required by By-Law 8-15 and desired by MI, according to MI's General Guidelines for the preparation of such studies (WSP Engineering 2018).

4.3 MAXIMIZING PREVENTION OF OFF-SITE NUISANCE

Broda plans to minimize the potential for significant persistent unmitigated impacts of trucking at the homes of its nearest neighbours. To meet this objective, Broda has developed an initial conceptual site layout, and a Conceptual Operating Plan (WSP 2019; confidential, in prep.), and has adapted SOPs from its many other quarries that, taken together, minimize neighbour exposure to trucking activity. The initial conceptual site layout places the centroid of the initial stages of quarry excavation (i.e., the first two decades of operation) north of Mollard Road, between well-established remnant stands of river-bottom forest to the east, east southeast, southwest and west south-west (Figures 1-2, 4-1). These trees will greatly reduce exposures of homeowners to quarrying operations, especially truck loading and site access movements.

Figure 4-1. Nominal centroid of three early stages of the quarry location on Broda's property relative to existing shelterbelts and remnant woodlots of river-bottom forest (oak, ash, aspen, black poplar) north of Mollard Road. Sources: Google Earth, MLi3 Inc.

4.3.1 Minimizing Exposures to Nuisance Trucking Views and Nuisance Sound Levels

A key element of Broda's draft Operating Plan and related SOPs is the use of clean non-marketable materials recovered during initial site preparations, especially from the removal of the underlying bedrock, to create strategic site berming for visual and sonic screening of the site. This is planned to occur wherever there is unrestricted visual or sonic access to the site, especially the area where the quarry excavation is placed on the current conceptual site layout. This occurs most especially along a short segment of Mollard Road between Klimpke Road to the east and Sturgeon Road to the west. Berming will occur to block all direct and currently unscreened sightlines between the nearest homes and businesses and the initial stages of the quarry north of Mollard Road (Figures 4-1, 4-2).

Fortunately, the intended layout of the site in relation to the remnant shelterbelt plantings and native river-bottom forest (Figure 4-1) is such that, taken together, there is very extensive visual and potential sound screening of the quarry and operating equipment already in place (Photos 1-4). Current visual and sonic screening of the site from adjoining homes is very substantial. This occurs because of the almost complete encompassing of the prospective quarry area viz. the nearest homes, and the vegetation types, crown height, planting densities and apparent health. Another positive factor for mitigating potential offsite transportation nuisance is the good condition of remnant shelterbelts species around the existing buildings on the property where trucks will be concentrated when on site (Photos 1-4).

Figure 4-2. Distribution of the occupied dwellings and businesses near the first few stages of the development of the proposed quarry. Sources: Google Earth, TetrES Consultants Inc., MLi3 Inc.

Photo 1. Typical remnant spruce shelterbelt and remnant native aspen wood. Near intersection of Mollard Rd. and Sturgeon Rd. Photo taken Oct 28. 2017. Source: MLi3 Inc.

Photo 2. Typical remnant shelterbelt on-site and remnant native aspen wood located near intersection of Mollard Road and Klimpke Road, at eastern edge of Broda property. Photo taken Oct 28, 2017. Source: MLi3 Inc.

Photo 3. Typical remnant rural residence shelterbelt and residual river-bottom oak forest screening home from views of accumulated farm equipment and non-functioning vehicles locations close to municipal road allowance and sightlines from the few adjacent homes. Located near eastern edge of Broda property. Photo taken Oct 28, 2017. Source: MLi3 Inc.

. Photo 4. Remnant oak forest southwest of proposed quarry area, on Broda land north of Mollard Rd. Remnant forest creates visual and sound-absorption barrier to the home to the southwest, ~800 m away. Lithic materials recovered during 2015 assessment of geological resource would be used in strategic site berming to create foundations for additional elevated vegetation plantings for more visual screening and sound absorption. Photo taken Oct 28, 2017. Source: MLi3 Inc.

There is currently unrestricted visual and sonic nuisance potential directly south of Mollard Road (Figure 4-3), and generally to the north. Clean-fill materials will be used to create several strategically located earthen berms immediately north of the narrow southern sightlines, along the northern municipal allowance for Mollard Road. The elevated surface of this additional visual screening will be planted with fast-growing trees and shrubs. Together, these measures will make site trucking and transportation-related operations effectively invisible to, and unlikely to be heard by, site neighbours after initial vegetation growth. Thus, the only transportation impacts likely to persist during the operations phase will be truck visibility and the vibration of their movements to and from the site along the short, ~1-mile segment of Mollard Road that intersects with Brookside Boulevard (Photos 5 and 6, Figure 4-3).

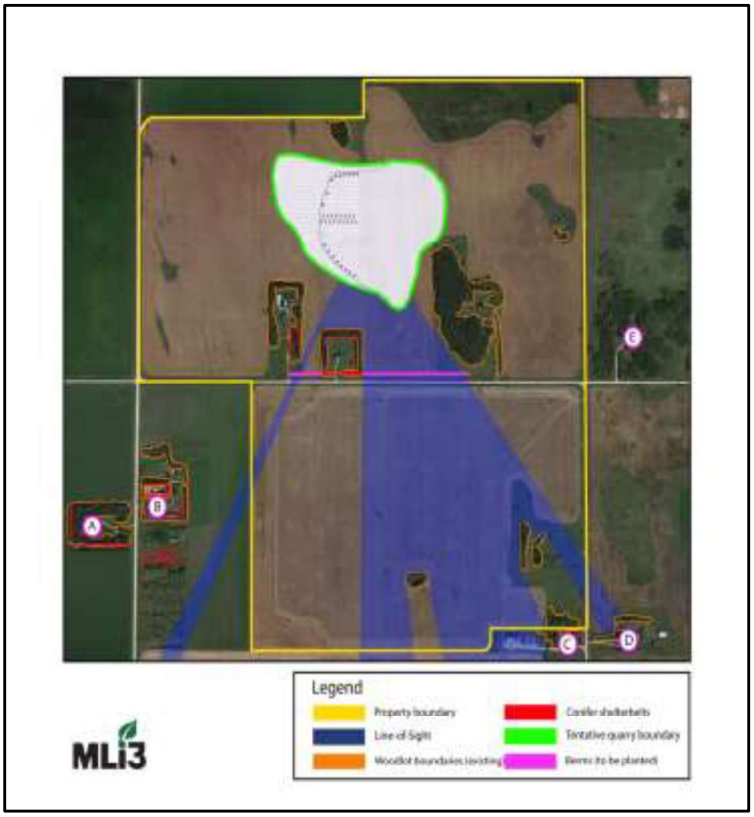


Figure 4-3. Potentially significant sightlines and sound-propagating pathways for adjoining homes within 1 kilometre of the first quarry-development stages are all south of Mollard Rd. Nuisance views and sound to be minimized and blocked by new earthen berms densely planted with fast-growing native trees and shrubs. Source: MLi3 Inc.

Photo 5. Recently upgraded intersection of Mollard Road and Brookside Blvd, looking north from Mollard. Photo taken Oct 28, 2017. Source: MLi3 Inc.

Photo 6. West-facing view of Mollard Road taken from east side of upgraded intersection with Brookside Blvd. Photo taken Oct 28, 2017. Source: MLi3 Inc.

Another key element of the draft Operating Plan and related SOPs is the use of a small, progressively-moving 'open face' of the pit as the quarry operation progresses across the site. On average, up to ~80% of the time (DST 2018), Broda intends to use "Continuous Surface Miner" technology to loosen and fragment rock as efficiently as possible. Up to ~20% of the time, on average, (DST 2018), Broda will use judicious blasting techniques to loosen rock that is too hard to be broken up by the Surface Miner. This combination will be superior to the best current practices in the Manitoba quarrying industry. Rock excavation by the Surface Miner will be means of a continuous excavation channel. This means that the working surface of the base of the trench will typically be about 5-8 m below grade (Figure 4-4).

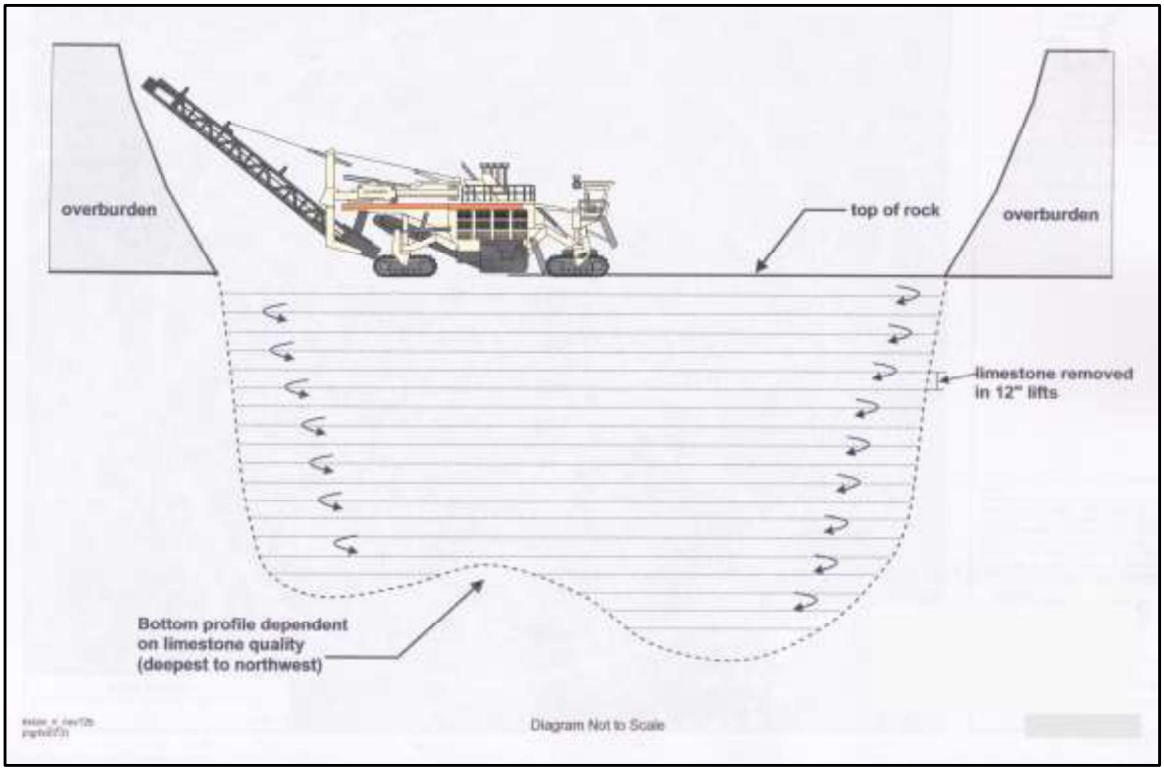


Figure 4-4. Surface Miner, truck-loading excavators and conveyor systems delivering aggregate from the working face will be well below sightlines and noise-propagation pathways from adjoining properties. Final depth is uncertain; will depend on field conditions. Sources: Google Earth, KGS Group 2010, Tetr*ES* Consultants Inc. 2010

Stockpiles of quarried and screened materials will be maintained at the base of the excavation. Most of the time, the tops of the stockpiles will not be visible above site berms. The Surface Miner operations creating the progressively-moving 'open face' of the pit will be confined to a relatively small operating area. This will happen because the excavation trench creating the quarry will be continually or periodically backfilled. This will occur as part of Broda's commitment to the state-of-the-art in quarry operations and site-rehabilitation practices (see the parallel Adaptive Management and Progressive Redevelopment Plan; MLi3 2019a).

The combination of a working surface below grade (with most of the truck-loading equipment and aggregate stockpiles being at this elevation) and the elevated top surface of the earthen berms, means that most heavy trucks and their related loaders will operate well below sightlines. More importantly, this means that the noise associated with truck filling from the stockpiles located below grade will be largely reflected upward rather than laterally through the site trees towards adjacent homes (of which there are only two close to the site).

4.3.2 Buffer Zone Creation

Broda advises that it will voluntarily adhere to quarry planning, operations-related, monitoring and decommissioning requirements set out under *The Quarry Minerals Regulation* (QMR; MR 65/92). Broda has adopted guidance from the QMR in seeking to meet these performance objectives notwithstanding that QMR prescriptions apply strictly to projects proposed on Crown lands. Their protective value, however, means that they are often applied by proactive and responsive developers for private-sector developments on private land. They are often used to create a "buffer zone "barrier against off-site export of nuisance visual or acoustic intrusions on the nearest neighbouring lands.

Broda's commitment is evident in the conceptual site layout, which complies with Clause 43(1)(b)(ii) of the QMR. This clause requires minimum separation/setback distance of 400 m between any rural residence and the aggregate-mining boundary. The extent of the current planned separation from the nearest occupied homes (~800 m) greatly exceeds the minimum requirement of the QMR (Figure 4-2). Thus, the conceptual site layout amplifies Broda's other impact-mitigation measures to be created from strategic site berming and vegetation plantings.

Site landscaping and visual screening using shelterbelt plantings will rely on classical long-proven federal government techniques identical to those used for planting rural home and farm shelterbelts (PFRA 2015), especially those immediately nearby (Photo 7). The intended species composition is intended to develop visual screening complexity, especially at the site perimeter.

Photo 7. Typical rural area shelterbelt, including outer rows of faster-growing native local deciduous trees (in this case, trembling aspen) protecting inner rows of slower-growing coniferous trees (in this case, spruce) located near intersection of Mollard Road and Brookside Blvd. Photo taken Oct 28, 2017. Source: MLi3 Inc.

5.0 WORK DONE TO DATE

5.1 PLANNING FOR SCREENING OF NUISANCE VIEWS AND SOUND PATHWAYS

Broda has analyzed viewscapes and sound-propagation pathways that could allow intrusive nuisance views and noise from trucking and loading activities at the quarry (e.g., Figure 5-1).

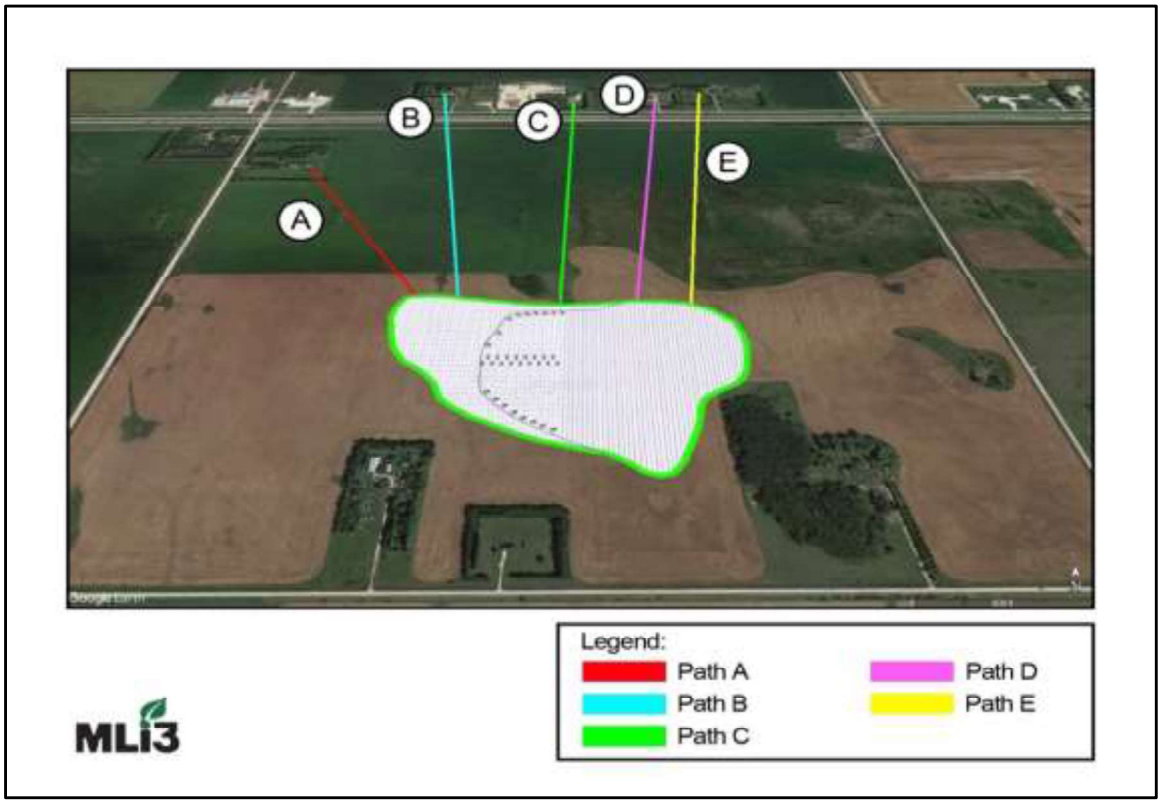


Figure 5-1. Illustrative distribution of surface-elevation profiles/visual pathways (in this case, from northerly properties) to the nominal nearest edge of early quarry stages north of Mollard Rd. Sources: Google Earth 3D, MLi3 Inc.

Broda has examined the southerly and northerly surface-elevation profiles (Figures 4-4, 5-1) to establish relative elevation differences between vantage points at homes south of the quarry, and homes or businesses north of the Perimeter Highway, and the nominal quarry edge (which will continue to evolve). Having been conducted prior to development, this has helped to define the pre-development visual-and nuisance-sound impact potential of this project. In turn, this has allowed planning for construction of new strategically-placed vegetated berms to block nuisance visual and sound pathways in the directions of adjoining homes and businesses. Five homes were found to have this potential north of the quarry and to require this mitigation (Figure 5-1), although this potential nuisance is minor relative to the significant impacts of PTH 101 traffic. This analysis was also important for determining whether buffer-zone prescriptions in the MMB QMR would be met if the quarry were excavated at the centroid of

the nominal first three stages of the quarry. Reference to Figures 4-2, 4-3, 5-1 and 5-2a, b, c, d) indicates that these prescriptions will be exceeded (by almost a factor of 2).

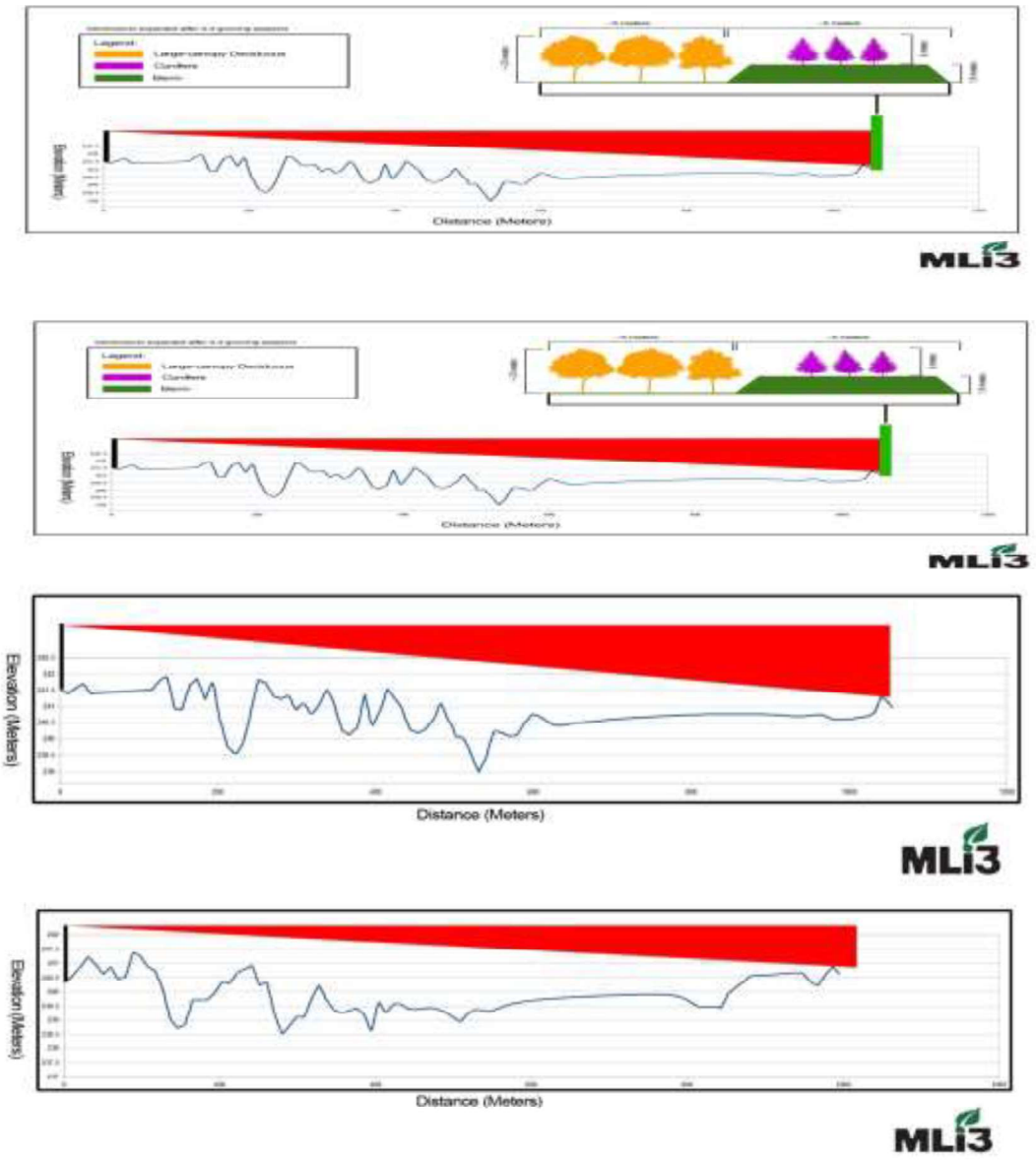


Figure 5-2a, 5-2b, 5-2c, 5-2d. Illustrative surface profiles from four northerly properties to nearest (nominal) edge of early quarry stages north of Mollard Rd., establishing pre-development visual pathways from 5 homes and businesses north of quarry. All sightlines towards locations north of Perimeter Highway require planted berms to preclude or reduce nuisance views of quarry. Sources: Google Earth 3D, MLi3 Inc.

Broda has also examined measures employed by other licensed and regulated quarries across Manitoba and Ontario (especially by Lafarge) for insights helpful to site-layout planning, vegetation-selection and planting, and operations planning for prevention of nuisance views and noise from trucking and truck-related activities.

5.2 CONSIDERING SITE LINKAGES TO REGIONAL TRANSPORTATION INFRASTRUCTURE

The 2009 EIA process and the subsequent internal corporate Environmental Due Diligence process (Tetr*ES* Consultants 2010) described the specifics of local and regional population demographyand the transportation system around the site in terms helpful to project-transportation planning. Several key details affecting this planning were as follows:

- The site is located ~0.8 km (0.5 miles) south of Provincial Trunk Highway 101 (the Perimeter Highway). PTH 101 passes in an arc through the south-eastern section of the R.M. and continues to circumnavigate the City of Winnipeg. Current direct access to PTH 101 from municipal roads will eventually be decommissioned (Magnusson *pers. comm.* 2017).

- The site is accessible by two Class 6 city roads, Klimpke Road (running north-south along the eastern site boundary) and Mollard Road (running east-west and bisecting the overall property). Klimpke Road north of Mollard is not currently an all-weather road. As noted, direct access to PTH 101 from Klimpke Road will eventually be decommissioned.

- Rosser community (1,412 residents, as reported by Statistics Canada in 2001) lies adjacent to the north-west boundary of Winnipeg. Of 545 people in the RM who responded to inquiries on modes of transportation in the 2001Census (Statistics Canada), 93% reported driving to work, whereas 2% reported traveling to work as a passenger in a personal vehicle.

- Public transit systems are not available in the RM.

- Three major highways converge within the Rosser boundaries. In addition to PTH 101, PTH 6 travels diagonally from the southeast to the north-western corner of Rosser and joins the RM to Grosse Isle, Warren and St. Laurent at Lake Manitoba. PTH 7 enters from the southeast corner of the RM as Brookside Boulevard, (and the extension of Metro Route 90) connecting to Stony Mountain and the South Interlake Area to the north.

- Provincial Roads 236and 221 pass through the RM to the north and northwest respectively.

- Two rail lines of Canada Pacific railway pass through Rosser from the north near PTH 7 and diagonally at an angle parallel to PTH 6.

- The James Richardson International Airport (JRIA) is a16-km drive from the centre of the RM.

- The *CentrePort Act*, assented to on October 9, 2008, mandated creation of an “inland port “to encourage transportation, warehousing, trade, manufacturing, and distribution throughout Manitoba, but especially in proximity to the JRIA. The province created a “Manitoba Development Plan for CentrePort Lands”, which sets out a vision for an enhanced future for the 20,000 acres within the Perimeter Highway (MMM Group 2009). About 54% of the CentrePort lands fall within the RM of Rosser. All the proposed southern

extension of PTH No. 6, and more than half of the length of the proposed CentrePort Canada Way, occur within the RM, greatly affecting intra-RM transportation patterns.

- The RM of Rosser Public Works Department is responsible for the maintenance and repair of paved and gravel streets, roads, and lanes within the RM except for Provincial Roads and Provincial Trunk Highways. The RM also maintains and replaces traffic control and traffic signals, line striping, bus stops and shelters.

5.3 QUARRY-TRANSPORTATION ROUTE PLANNING

Broda's 2009 internal corporate Environmental Due Diligence process (Tetr*ES* Consultants 2010) outlined the initial conceptual Transportation Plan for the project. Key elements of the initial Plan included the following;

- Stockpiled finished limestone products were to be purchased and hauled by clients to construction projects needing the limestone aggregate.

- Access to the site was initially planned to be along the north-eastern border of the site with an entrance on Klimpke Road, ½ km south of, and accessible from, Perimeter Highway. Plans for potential extension of the gravel-road system within the property boundaries toward a more northerly junction with Klimpke Road were proposed to reduce potential traffic on the municipal roads in the area, especially to preclude transportation nuisance for the one home adjacent to and east of the quarry.

- Broda's commitment to support construction and maintenance of a new frontage road between Sturgeon and Klimpke Roads, to allow for direct access to the north Perimeter, at only engineered signalized intersections. Broda was then (and still is) prepared to consider a southerly site access/egress location vis. an upgraded Klimpke Road to facilitate traffic to/from the proposed southern extension of PTH No. 6 and/or the proposed CentrePort Canada Way (CCW; Figure 5-3). (*NOTE: This possible access route is now dependent upon current MI transport planning policy (e.g., long-term future of PT 1010 as higher-speed 'freeway'*; Magnusson *pers. comm.* 2017) *and plans for extension of Chief Peguis Trail (CPT). This westerly extension of CPT won't proceed along Farmer Ave., but will instead utilize a parallel routing approximately one half mile farther north).*

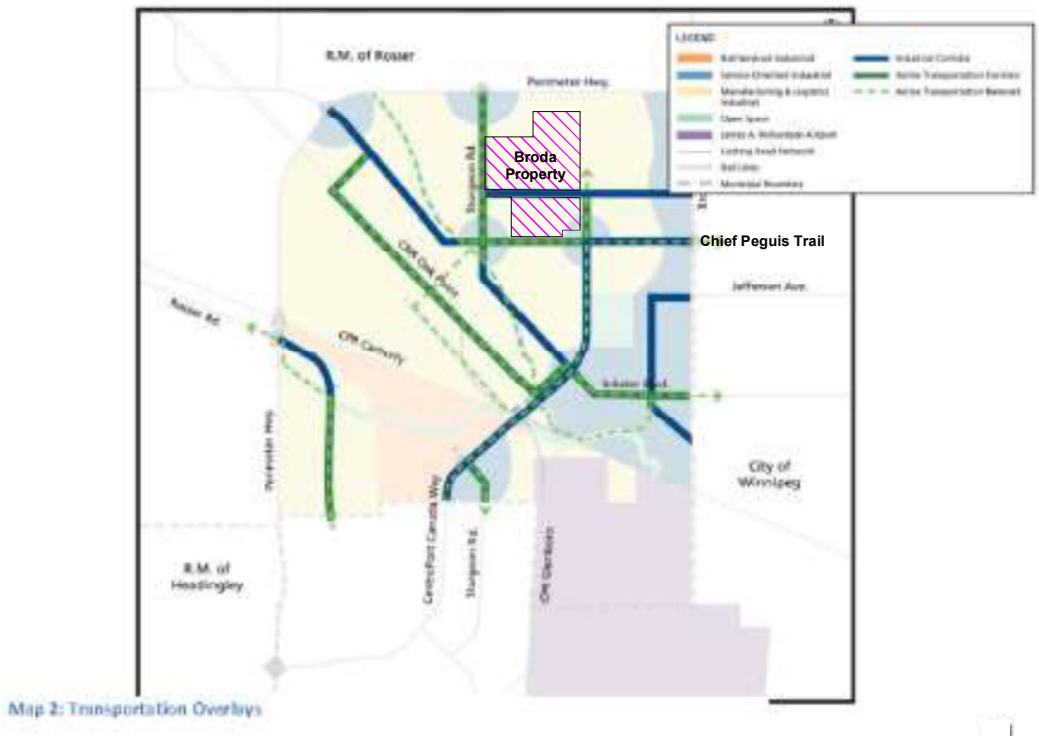


Figure 5-3. Regional transportation planning for servicing of CentrePort Canada, via CentrePort Canada Way. A southerly extension and upgrade of Klimpke Road east of the Broda site, along with a westerly extension of Chief Peguis Trail, could create increased access/egress for the quarry on RM roads. Source: RM Rosser CentrePort Secondary Plan.

- Broda's hope, following consultations with and at the suggestion of a local CAC, and assuming approval by the RM Council, to block northerly access to Klimpke Road at its intersection with Mollard Road. This blockage would stop vehicular traffic from accessing the Perimeter Highway via that route. Broda would then use this as a major sole access road to the site, thereby diverting truck traffic from using Sturgeon and Mollard Roads which have more homes along their lengths than Klimpke Road. [If MI could agree to proposed closure of Klimke Road, and to reduce the impact of such closure, Broda would consult further with the local CAC to identify a locally acceptable alternate routing, particularly in the light of current planning for the southern extension of PTH No. 6 and the new Chief Peguis Trail extension to CCW (Figure 5-3)].

Since then, Broda has commissioned a Traffic Impact Study (WESP Engineering 2018). The Traffic Study was based on new traffic-count data at major adjacent intersections of Mollard Road with Klimpke Road and Brookside Boulevard. These new data were considered relative to projections of 70 (nominal) new trips (40 entering and 30 exiting) and 20 passenger (nominal) vehicle trips during the weekday 'a.m. peak hour' and 70 (nominal) new trips (30 entering and 40 exiting) and 20 (nominal) passenger vehicle trips during the weekday 'p.m. peak hour'. Sophisticated traffic-movement-modeling software projected (i) future traffic flows and turning movements at the relevant intersections, the corresponding "Levels of Service"; (ii) the

potential for delays at these intersections; (iii) the potential for collisions at these intersections; and (iv) the need for signals at selected intersections.

Recent information about elaboration of regional transportation infrastructure within a few miles of the site has updated this original approach to transportation planning. A public Open House held November 7, 2017, provided the results of a Functional Design study for a westerly Extension of Chief Peguis Trail (CPT) from Main Street to Brookside Boulevard (WSP 2017). Functional Design is an early phase of the transportation-engineering design process in which the road right-of-way and roadway design are established. Preliminary Design was the next phase in the design process and built on the Functional Design (WSP 2017). The 2018 Preliminary Design included greater detail of all design elements (i.e., lane width, intersections, etc.).

Key relevant aspects of the 2017 Functional Design included:

- A four-lane divided CPT roadway from Main Street to Brookside Boulevard in Rosser.
- At-grade intersection at Brookside Boulevard.
- Initial termination of the extension at Brookside Boulevard when the CPT extension is constructed, with provision for future extension directly west, parallel with Mollard Road to the north, before turning south along Klimpke Rd. towards CentrePort Canada Way, northwest Winnipeg (Highway 190 in Figures5-4, 5-5, 5-6, 5-7below).

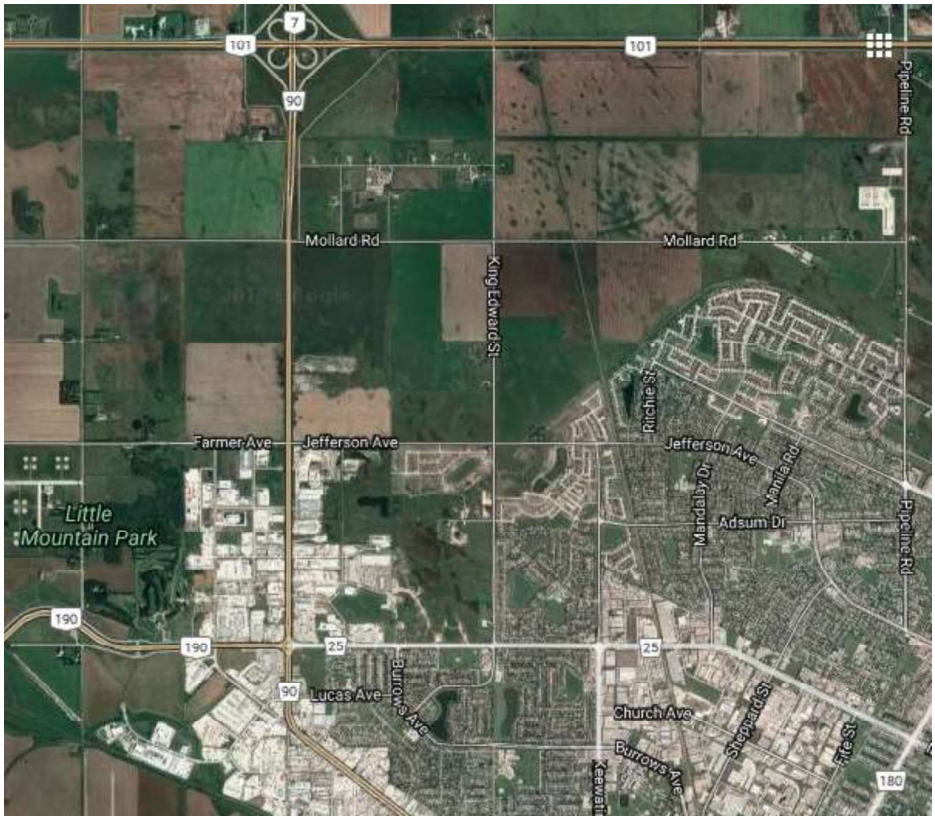


Figure 5-4. Study area for Functional Design process for the Chief Peguis Trail extension west from Main Street to Brookside Boulevard. Source: Google Earth.

One important factor that may affect the Haul Route for the quarry is the new alignment for the Chief Peguis Trail extension. Once that route is developed, and especially if Broda has extended his quarrying activities to the southern portion of his property, this route will be immediately adjacent to the quarry. At that time, it may make sense to route the quarry traffic along the CPT extension rather than Mollard Road. The alignment for the CPT extension was shown above on "Map 2" from the Rosser CentrePort Secondary Plan.

Figure 5-5. CPT extension southeast of Mollard Rd. and the proposed quarry. Source: WSP 2017.

Figure 5-6. Initial termination of CPT extension at Brookside Blvd. east-southeast of proposed quarry. Final extension to occur west of initial terminus. Source: WSP 2017.

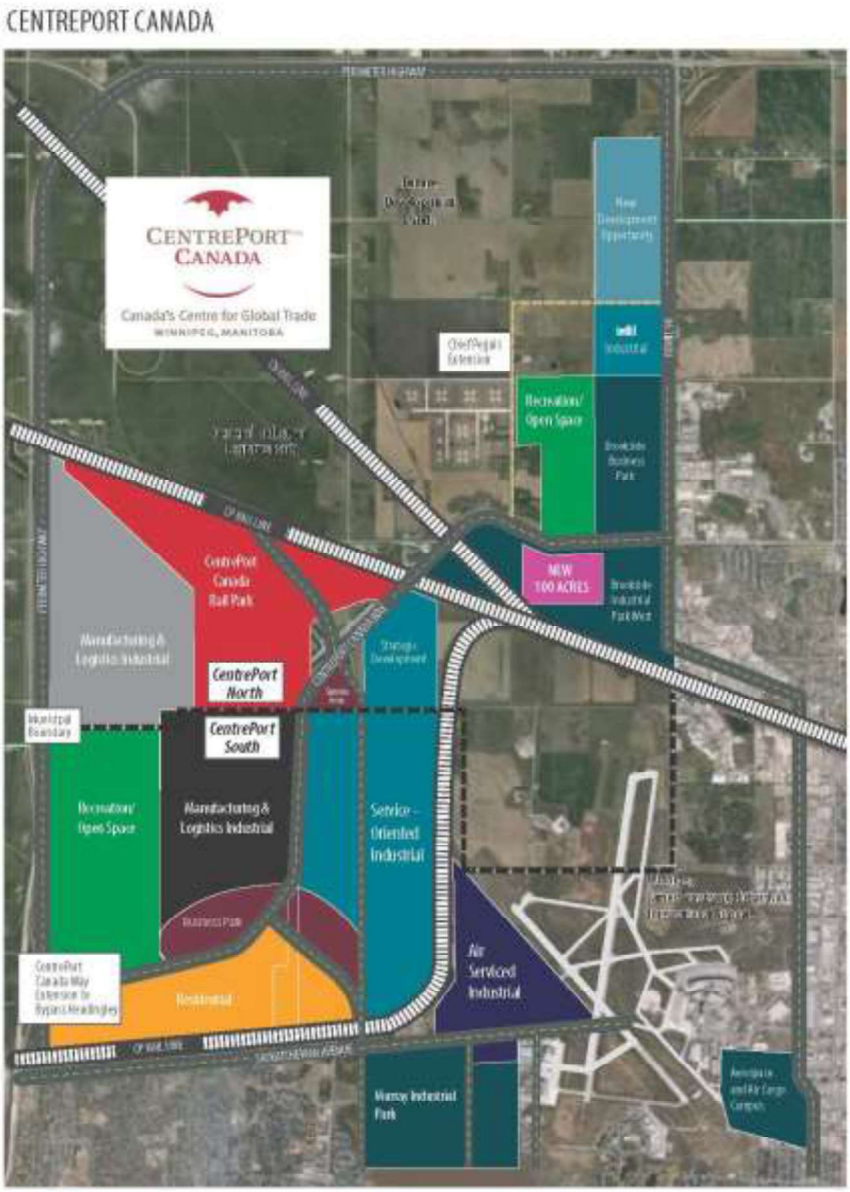


Figure 5-7. Current CentrePort Canada planning for integrated multimodal transportation hub, relying on extension of Chief Peguis Trail southeast of Broda land.

Source: CentrePort Canada 2017

Based on all the foregoing information, the 2018 WSP Engineering Traffic Impact Study concluded that:

- the collision data and collision rates predicted to arise from quarry operations do not "*identify any significant concerns*".

- the intersection of Mollard Road and Brookside Boulevard will operate "*at an acceptable level of service*" with the proposed development. Right-turning passenger cars expected to turn from Mollard Road onto southbound Brookside Boulevard, and left-turning passenger cars expected to turn from northbound Brookside Boulevard onto

westbound Mollard Road, will "*have sufficient gaps in traffic flow to complete their turning movements*".

- Signal-warrant analysis "*does not show a need for new traffic signal and there are sufficient* [traffic-flow] *gaps to accommodate the forecast turning movements*".

To establish useful context for these findings: careful consideration of the WSP Functional Design study information (WSP Engineering 2017) strongly suggests that two homes southeast of the site and within ~1.1 km of the proposed quarry (Figure 4-2) would be impacted much more significantly by the CPT-extension project and the future connection to CentrePort Canada Way (CCW) than by the quarry operations. The combination of the CPT-extension and the CCW-connection will create a future southbound curve in the new Chief Peguis Trail extension. This will require construction somewhere on Klimpke Rd. between Mollard Rd and Farmer Rd. (Figure 4-3 viz. Figures 5-4, 5-5 and 5-6). These interrelated infrastructure projects will likely create substantial traffic impacts for these two southeasterly homes because of the intended use of this new transportation infrastructure as a major bypass of the City, especially if a small-radius curve is proposed in the Functional Design for this interchange. Substantial public use of the new infrastructure is expected, especially by cargo traffic to the International Airport and the rail-truck transload facility in CentrePort. Final alignments have not been chosen, nor has the location of the southerly curve towards CCW. However, consideration of the above-noted figures indicates that a substantial amount of land would be required at Klimpke where the extended Chief Peguis Trail will turn south if the curve radius is large. Even with a small-radius curve, the construction of the curve and sustained heavy traffic will likely significantly impact those landowners at that time.

5.4 PLANNING FOR TRAFFIC CONTROL AND SAFETY

The previous Transportation Plan evaluated in the 2009 process and the 2010 EDD set out the following expected traffic volumes, traffic controls and safety measures:

- Broda expects between 150 and 200 trucks/day at peak production, and between 50 to 75 trucks/day when demands for aggregate are low, with an average of about 70 (nominal) movements/day in each of the peak daily a.m. and p.m. traffic-flow hours. This is a significant increase in traffic compared with what would normally be experienced in a rural area; however, fewer than about two dozen homes occur within a 3-km radial distance of the site, and only three occur within ~850 m. The results of the Traffic Impact Study which Broda has completed to assist MI transportation planning indicates that existing and projected traffic-movement patterns will not be significantly adversely affected by the development.
- The increased truck traffic could in some cases contribute to compaction and rutting of unpaved roads, and airborne dust, and could affect some wildlife movements. Broda will enforce proper truck routes and will ensure no local nuisance road dust is created by truck traffic via periodic wetting of any unpaved access road. In the event of a complaint, Broda will conduct visual checks and take immediate action.

- Because safety issues arise from transporting quarry equipment and aggregate materials to and from the site, Broda's staff and all trucking contractors will be required to follow Manitoba's *Workplace Safety and Health Act*, the safety guidelines prescribed by Manitoba Transportation and Government Services, and the SOPs and Emergency Response Plan that will be developed and finalized prior to project construction.

5.5 COLLABORATIVE GOVERNMENT LIAISON

In September 2009, Broda (and Tetr*ES* Consultants, supporting Broda's project-planning process) attended a public Open House hosted by MIT and the MMM Group (then-MIT's transportation-planning consultant) to understand the then-current planning for land use and transportation within the proposed CentrePort lands. Broda and Tetr*ES* met with representatives of the MMM Group (now WSP) and MIT (now MI) to acquaint them with the proposed quarry project. Broda and Tetr*ES* explained the province's "high quality" designation of the limestone resource, to help MI and MMM Group understand the implications for transportation within the region.

Broda and Tetr*ES* met with MIT personnel in October 2009 in a project focused transportation-planning exercise about the site's location within the proposed CentrePort lands.

The discussion focused on MIT's then-current perceptions on transportation planning within the proposed CentrePort lands and how access and egress to the proposed quarry site could integrate with the proposed new regional transportation-planning network. The dialogue centred on ways to minimize public nuisance while maximizing the delivery of aggregates which could be needed by the evolving construction of the CentrePort project and all construction within the Winnipeg region. MIT acknowledged the significance of benefits from a quarry closer than those operating further north, minimizing public nuisance and construction costs for developments within the proposed CentrePort project area.

In subsequent consultations with MIT, it became apparent that Broda's proposed nuisance-avoiding ingress/egress to the Perimeter Highway would not be entertained. In default, the current Transportation Plan has evolved to contemplate quarry access from Mollard Road a short interval from its intersection with Brookside Boulevard (PTH 7) (Figure 4-2).

To develop a quarry ingress/egress point at the intersection of Mollard Road with Brookside Boulevard would have required improvements to that intersection. MIT indicated that these might include turning lanes and widening of the roadway. As well, Mollard Road may have needed to be paved to accommodate the increased traffic volume and vehicle weight from quarry traffic. Broda's Transportation Plan would have evolved, and will still evolve, to create these improvements if recommended by any Traffic Impact Study now requested by MI.

This Plan continues to maintain these previous public commitments.

5.6 COLLABORATIVE PROJECT PLANNING WITH NEIGHBOURS

The current Conceptual Operating Plan was initiated some years ago in consideration of issues raised by the CAC neighbours in the previous stages of project planning. The Conceptual Operating Plan (WSP 2019; confidential, in prep.) will be further refined through further collaboration with MI, MMB and the CAC.

6.0 ADDITIONAL WORK TO BE DONE

It has been necessary to review the quarry transportation route with Manitoba Infrastructure - Highways Branch again, in the context of any recent developments or changes in the transportation network in the CentrePort area. Broda received guidance from MI's Engineering and Operations Division (Highway Planning and Design Branch) on its preferences for transportation routing at a meeting with MI on December 18, 2017.The RM of Rosser's CentrePort Secondary Plan (By-law 17-14) designated Mollard Road as an Industrial Corridor extending to Brookside Blvd (PTH 7). Industrial Corridors are intended to carry industrial traffic. It is therefore expected that this will include quarry traffic, based on MI's guidance to Broda at the December 18th meeting.

Broda has recently acquired new traffic information. WSP Engineering completed a confidential Traffic-Impact Study for Broda in September 2018 (WESP Engineering 2018). Broda is now considering the study findings and recommendations. It intends to file the WSP Traffic Study with the RM for its review pursuant to By-law 8-15. The traffic-study findings and recommendations have been used to refine and update this Transportation Plan. Along with other documents to support the rezoning application, it too will filed with and reviewed by both MI and the RM.

Broda has not yet finalized selection of site-operating equipment. Highly relevant will be choice of conveyors and heavy loaders that would load stockpiled aggregate into trucks. Based on the types of equipment finally chosen, options for reducing the number of pieces of heavy equipment will also be explored. So will opportunities for optimizing truck-loading efficiency. Final choice of equipment will also be driven by decisions around finalizing the most effective site layout. These decisions will all add significant capital, and O and M, costs to the development. Once these final layout, equipment, and operating regime decisions have been made, the implications for costs and cost recovery will be determined. These data will be important for the RM to understand in the dialogue regarding a mutually agreeable Development Agreement.

The current Conceptual Operating Plan (WSP Engineering 2019; confidential, in. prep) was developed in consideration of issues raised by the CAC neighbours in previous stages of project planning. The Conceptual Operating Plan will be refined through further collaboration with MI, MMB and the CAC. In respect of further input from the CAC, and any other neighbours who wish to engage in transportation planning specifically, Broda will solicit such involvement.

It is fully expected that the nuisance-prevention, -minimization and -management measures planned for the quarry operation will satisfy corporate and regulatory requirements. Sustained dialogue will be maintained with key government personnel from the Community and Regional Planning and Sustainable Development departments to determine whether their needs are being met. Quarry operations will also be subject to third-party inspection by WHSD and possibly MSD. In the event of any exceedances of the regulations, measures would be immediately undertaken to address those exceedances.

7.0 MONITORING TO ASSESS PERFORMANCE

Section 13e of Rosser's Quarry Operations By-law states that all parties hauling from the quarry must use the designated haul road. During quarry operations, Broda's Preliminary Environmental Monitoring Plan (MLI3 2019f; confidential, in preparation) will monitor traffic ingress and egressing the quarry to ensure that the designated quarry route is being utilized.

As well, quarry neighbours will be encouraged to report any quarry traffic that may be observed using local roadways in the quarry area as a "shortcut" to the quarry. Any vehicle/driver hauling from the quarry that is found to be using any route other than the designated quarry routing will be cited. In the event of a second violation, that vehicle will be prohibited from hauling to or from the Broda Quarry.

Periodically, traffic counters will be deployed along Mollard Road and PTH 7, and at nearby 'reference locations', to monitor the traffic volumes. These data will be used to ensure that the quarry is not having a noticeable effect on the other traffic that has historically utilized these reference-location routes (i.e., that haulers are not by-passing the designated access/egress route). Data will be reported to MI and to the re-activated CEC on a quarterly basis. Any expressions of concern from these parties about these data will be attended to by Broda. If evolution of the AMPRP (MLi3 2019a) is deemed necessary, then site infrastructure, access rules, monitoring systems, signage and non-compliance penalties will be strengthened.

8.0 PLAN CONSISTENCY WITH "BEST PRACTICE"

Broda will comply with all relevant applicable statutes and regulations in managing transportation to and from its property. The final quarry access route, and the preferred access/egress point to the provincial highway system continues to be considered the site-specific Best Practice for transportation-impact prevention and -minimization because it continues to be the solution endorsed by MI. The Recent Traffic Impact Study indicates that access from an un-signalized Mollard Road-Brookside Boulevard intersection can be accommodated within existing and projected (2029) traffic flows and that projected incremental truck (and private passenger) vehicular movements will not cause significant impact and should not cause "concern" (WSP 2018).

Broda considered several routing and access options in its 2009 EIA. It indicated willingness in the 2010 Conditional Use process to develop a preferred route and access point with the guidance of the Highways Department. The options required a variety of improvements to make them viable and the costs would have been considerable. Broda was nonetheless willing to adopt any of the options; Broda advises that it was not concerned about identifying a "least-cost" alternative. Broda has accepted the recommendation from MI offered at the December 18th, 2017 meeting as the best compromise among the unavoidable trade-offs inherent in transportation planning. The WSP study confirms that this solution will cause no significant impacts.

9.0 PLAN EVOLUTION

Broda's Transportation Plan may potentially be modified through liaison with neighbors, the RM, MI or the CentrePort leadership. During quarry operations, all input from outside parties regarding dust, noise, use of unsanctioned routes, etc., will be tracked and the performance of the Transportation Plan will be re-evaluated.

As noted: one important factor that may affect the designated Haul Route for the quarry is the new alignment for the Chief Peguis Trail extension. Once that route is developed, and especially if Broda has relocated quarrying activities to the southern portion of the property, this route will be immediately adjacent to the quarry (Figures 5-5, 5-6, 5-7). At that time, it may make sense to route the quarry traffic easterly along the CPT extension rather than along Mollard Road, if acceptable to both MI and the RM to seek 'zero impact' of quarry truck traffic. No change from the recommended route suggested by MI on December 18th, 2017 will occur if not acceptable to both the RM and MI.

10.0 CLOSURE

The proposed project is to occur over formally designated “High Quality” deposits already developed for similar limestone-aggregate extraction and quarrying activities. These occurred on the southern continuity of the same geological formation, trending beneath the Broda property towards the southeast. Part of the City of Winnipeg’s Little Mountain Park has been developed right beside the rehabilitated former pits/quarry excavations as a community athletic amenity for public recreation (baseball diamonds) (Figures 1-1, 1-4).

Potential nuisance from truck traffic to the development should be confined to the one landowner living east of the site on Mollard Rd., given that this access route on Mollard remains the preference of MI (Magnusson *pers. comm*. 2017. Most potential sonic and visual nuisance from trucking should be prevented, minimized, or mitigated by the low population density (only three homes) within ~850 m (Figure 4-2), and by (i) Broda’s adherence to an integrated site sound-screening system of perimeter and localized strategic vegetated berming; (ii) situation of most heavy equipment below-grade, and (iii) the existence of substantial and well developed shelterbelts and remnant river-bottom forest stands providing visual screening of neighbouring homes from both the site and the municipal road allowances (Photos 1,2, 3, 7). As noted in section 5.3, for two homes within ~1.1 km southeast of the quarry, planned new regional highway infrastructure focussed on CentrePort in Rosser is likely to create relatively great traffic impacts and nuisance compared with minor nuisance from quarry traffic on Mollard Rd.

This Transportation Plan supports a formal filing for rezoning of the land by the SPA and will support negotiation of a mutually agreeable Development Agreement with the RM. It embodies the “state of the art” in progressive management of the potential for transportation impacts from a modern quarry during its operational phase. Its submission is to demonstrate Broda’s partial completion to date, and intention to complete, all relevant and applicable portions of Rosser By-law 8-15. Its development and execution also demonstrate satisfaction of the requirements set out in *The Special Planning Area Regulation* 49/2016 and the *Inland Port SPA Planning Regulation No. 48/2016* that, taken together, allow a quarry as a permitted land use within the Heavy Industrial Zone (Class 3; "I3") on the CentrePort land base. Adherence to the ongoing and evolving Plan will also help guide the planning for transition to an end use(s) desired by a reactivated and strengthened Citizens Advisory Committee.

This Plan has been developed in consultation with government personnel who have applicable expertise. It is intended to be the best possible Plan that could be developed for this site and operations utilizing environmentally “Best Available Technology Economically Achievable”.

The Plan demonstrates satisfaction of previous corporate commitments to: (i) the CAC, (ii) participants at several public Open Houses and RM of Rosser public hearings about the proposed project, (iii) three neighbour landowners within about a half-kilometre of the Broda property, (iv) Manitoba Mines Branch and (v) MI.

MLi3 has observed that Broda strives to set itself apart as a professionally managed, environmentally responsible, corporate citizen. MLi3 Inc. believes that Broda will take the necessary steps to ensure that its site sound-screening (and related adaptive-management) practices support this goal.

The foregoing is unbiased independent work by MLi3 Inc.

11.0 CITATIONS

11.1 LITERATURE CITED

Baracos, A. 1983. Geological Engineering Report for Urban Development of Winnipeg. Department of Geological Engineering, University of Manitoba. Winnipeg, MB. 78 pp.

MLi3 Inc. 2019a. Adaptive Management and Progressive Rehabilitation Plan in Satisfaction of Rural Municipality of Rosser Quarry Operation By-law no. 8-15. Submitted to Rural Municipality of Rosser by North Perimeter Aggregates Inc., Broda Properties Inc. Submission in support of application for rezoning of land. Winnipeg.

MLi3 Inc. 2019b. Sound Impact Assessment and Sound Impact Management Plan in Satisfaction of Rural Municipality of Rosser Quarry Operation By-law no. 8-15. Submitted to Rural Municipality of Rosser by North Perimeter Aggregates Inc., Broda Properties Inc. Submission in support of application for rezoning of land. Winnipeg.

MLi3 Inc. 2019c. Transportation Plan in Satisfaction of Rural Municipality of Rosser Quarry Operation By-law no. 8-15. Submitted to Rural Municipality of Rosser by North Perimeter Aggregates Inc., Broda Properties Inc. Submission in support of application for rezoning of land. Winnipeg.

MLi3 Inc. 2019d. Visual Impact Assessment and Visual Impact Management Plan in Satisfaction of Rural Municipality of Rosser Quarry Operation By-law no. 8-15. Submitted to Rural Municipality of Rosser by North Perimeter Aggregates Inc., Broda Properties Inc. Submission in support of application for rezoning of land. Winnipeg.

MLi3 Inc. 2019e. Water and Natural Resources Management Plan in Satisfaction of Rural Municipality of Rosser Quarry Operation By-law no. 8-15. Submitted to Rural Municipality of Rosser by North Perimeter Aggregates Inc., Broda Properties Inc. Submission in support of application for rezoning of land. Winnipeg.

MLi3 Inc. 2019f, in preparation. Preliminary Environmental Monitoring Plan to support satisfaction of requirements of Rural Municipality of Rosser Quarry Operation By-law no. 8-15. Winnipeg.

MMM Group. 2009. PowerPoint presentation entitled “Manitoba Development Plan for CentrePort Lands, Steering Committee Meeting No. 3.” August 20, 2009.

Prairie Farm Rehabilitation Agency (PFRA). 2015. Shelterbelt planning and establishment. Agriculture and Agri-Food Canada. Available online at: http://www.agr.gc.ca/eng/science-and-innovation/agricultural-practices/agroforestry/shelterbelt-planning-and-establish.

TetrES Consultants Inc. 2010. Environmental Due Diligence (EDD) Report: Environmental Assessment of Proposed Limestone Quarry – RM of Rosser. Report to Broda Group of Companies. Winnipeg, Manitoba.

WSP Engineering (WSP Canada Group Limited). 2019 (in prep). Rosser Quarry Conceptual Operating Plan. Confidential Report to Broda Properties Inc. Winnipeg.

WSP Engineering (WSP Canada Group Limited). 2018. Proposed Limestone Quarry in The RM of Rosser Traffic Impact Study. Confidential Report to Broda Properties Inc. Winnipeg.

WSP. 2017. Preliminary design of the Chief Peguis Trail extension west. Public Information Session, November 7th, 2017. Winnipeg.

11.2 PERSONAL COMMUNICATIONS

Broda, G. 2018. Email communication of January 21 2018 from President of Broda Properties Inc. responding to email communication of November 17 2017 from Michael McKernan of MLi3 Inc. to Broda Properties Inc. by confirming that the corporate commitments and statements that MLi3 Inc. made in the WNRMP document on behalf of Broda Properties Inc., that MLi3 Inc. relied on in completing its assessment of potential impact-management and -prevention measures and associated Plans (including the WNRMP), remain accurate portrayals of Plans and corporate commitments made by Broda Properties Inc.

Magnusson. B. 2017. Verbal statements made to Broda Manitoba Properties Inc. and MLi3 Inc. representatives at the meeting of December 18th, 2017 regarding Manitoba Infrastructure's current preference for access to the Broda site, and MI's acceptance in principle of Broda's impact- management and –prevention measures as present within its then-current proposed draft Transportation Plan.

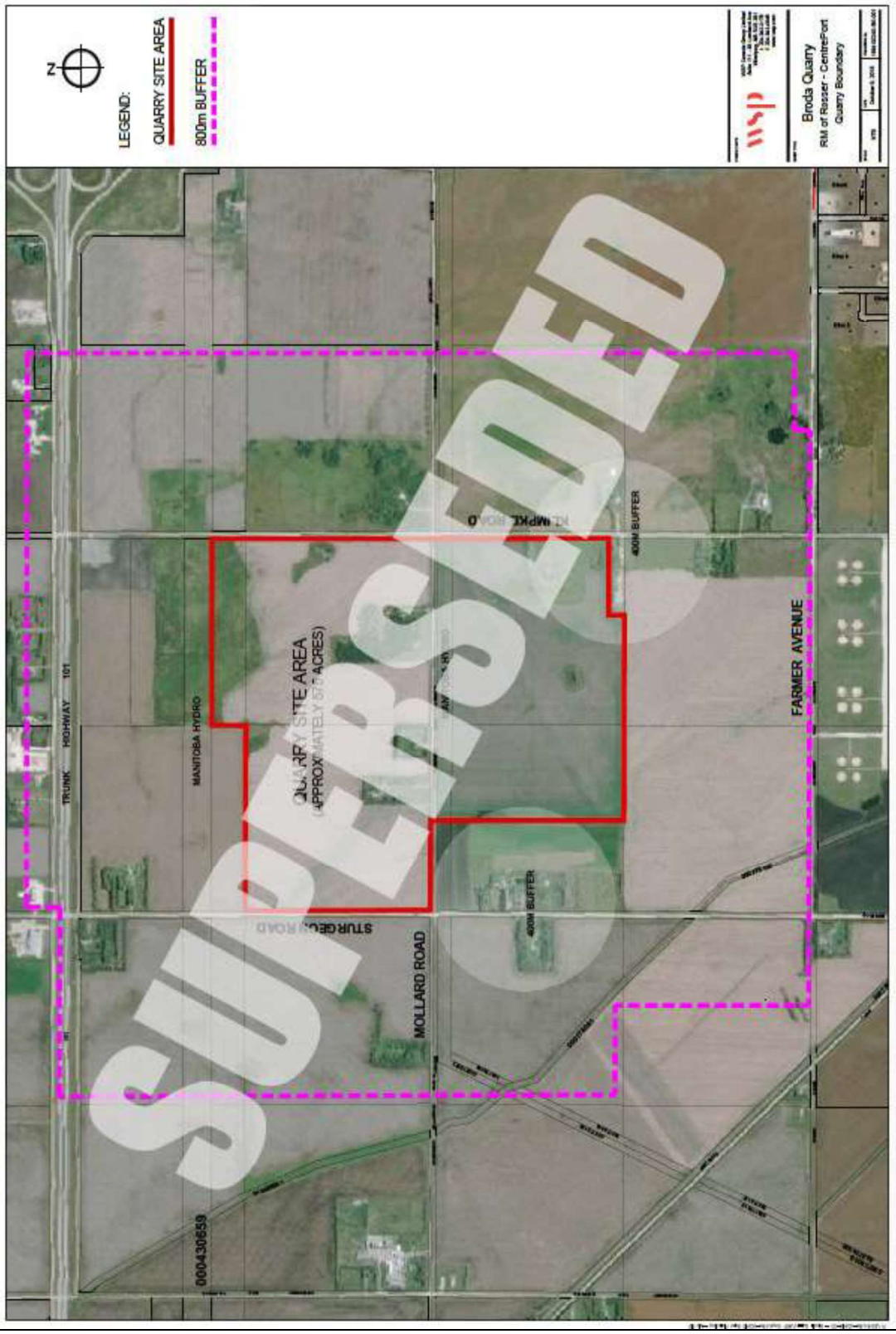
APPENDIX A CONCEPTUAL SITE OPERATING PLAN

Initial Site Layout and Development Schematics

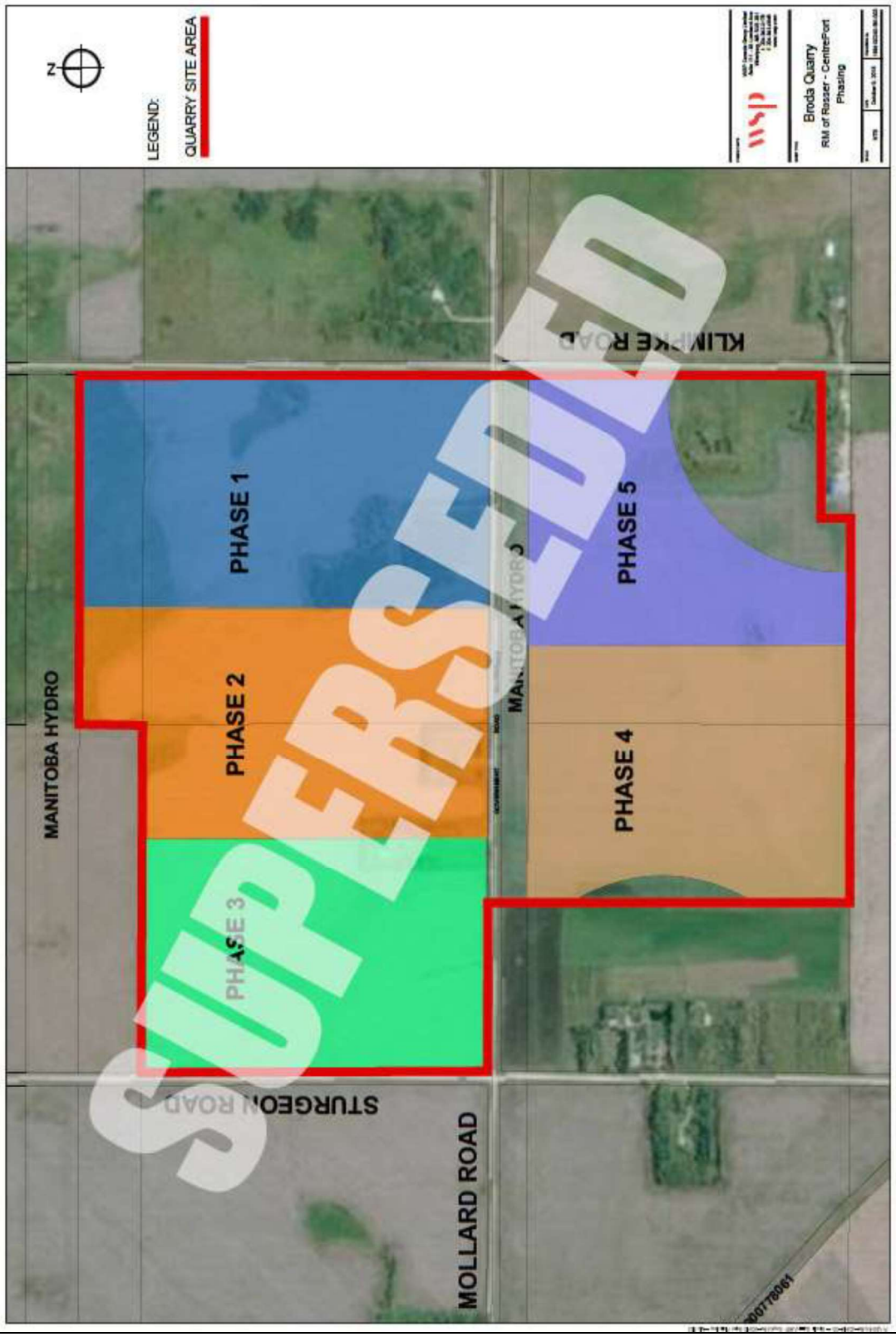
The conceptual operating plan, which continues to evolve, has been built around a core commitment to the use of Continuous Surface Miner technology. A typical Surface Miner, in this case, manufactured by Wirtgen, is shown in figure A-1 below.

Figure A-1. A Wirtgen 4200SM Surface Miner.

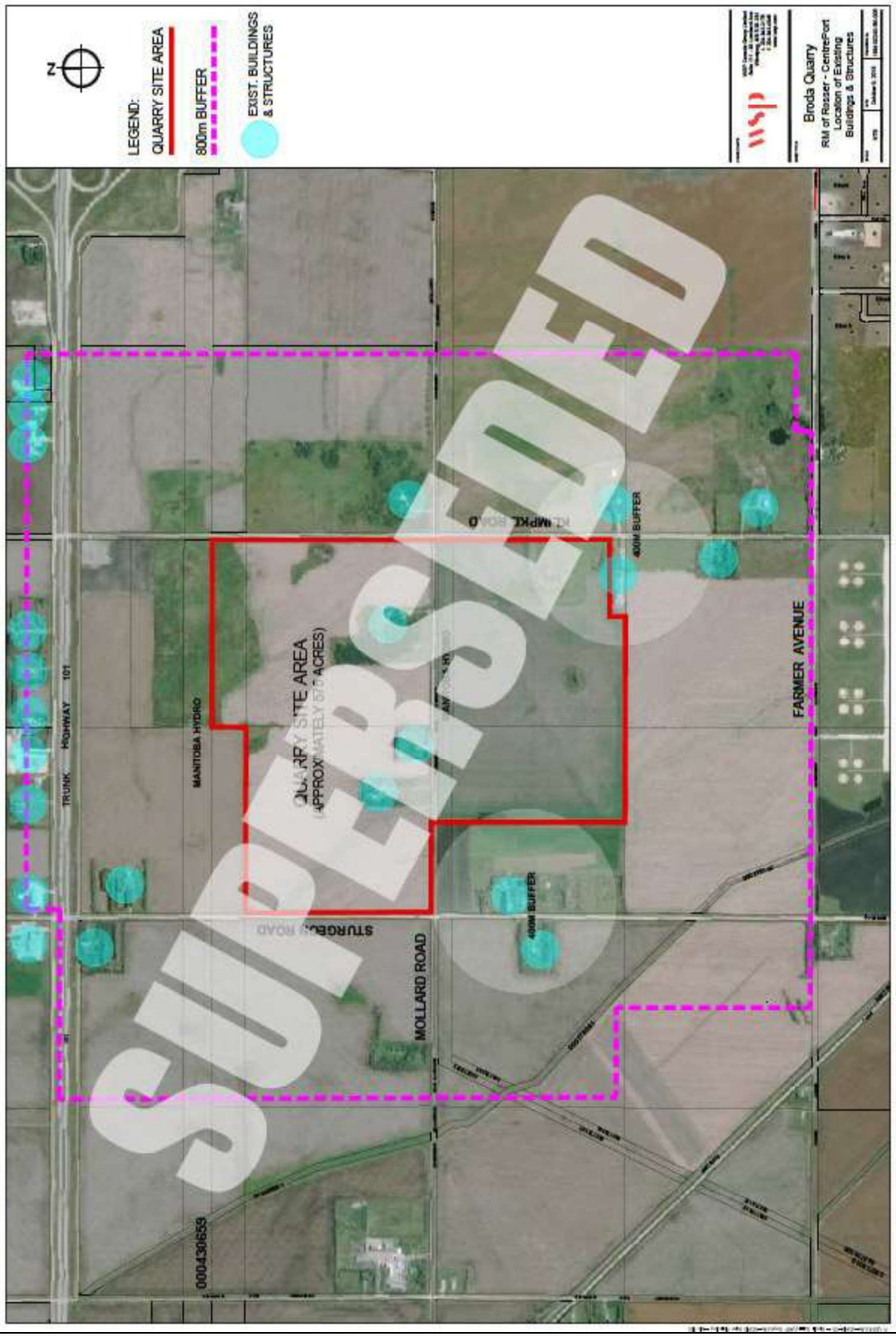
The most important elements of the current working draft of the Conceptual Operating Plan are preliminary site layout drawings which have been developed mindful of (i) the physical attributes of the site; (ii) the intended reliance on Surface Miner technology; (iii) the intention to minimize surface water ponds and groundwater accumulations on the site; and (iv) many corporate commitments to preclude, or minimize, visual and sound impacts being experienced at adjoining properties. The current draft drawings follow below; these draft drawings have recently been superseded and will continue to evolve before being finalized and submitted for review by the RM of Rosser.

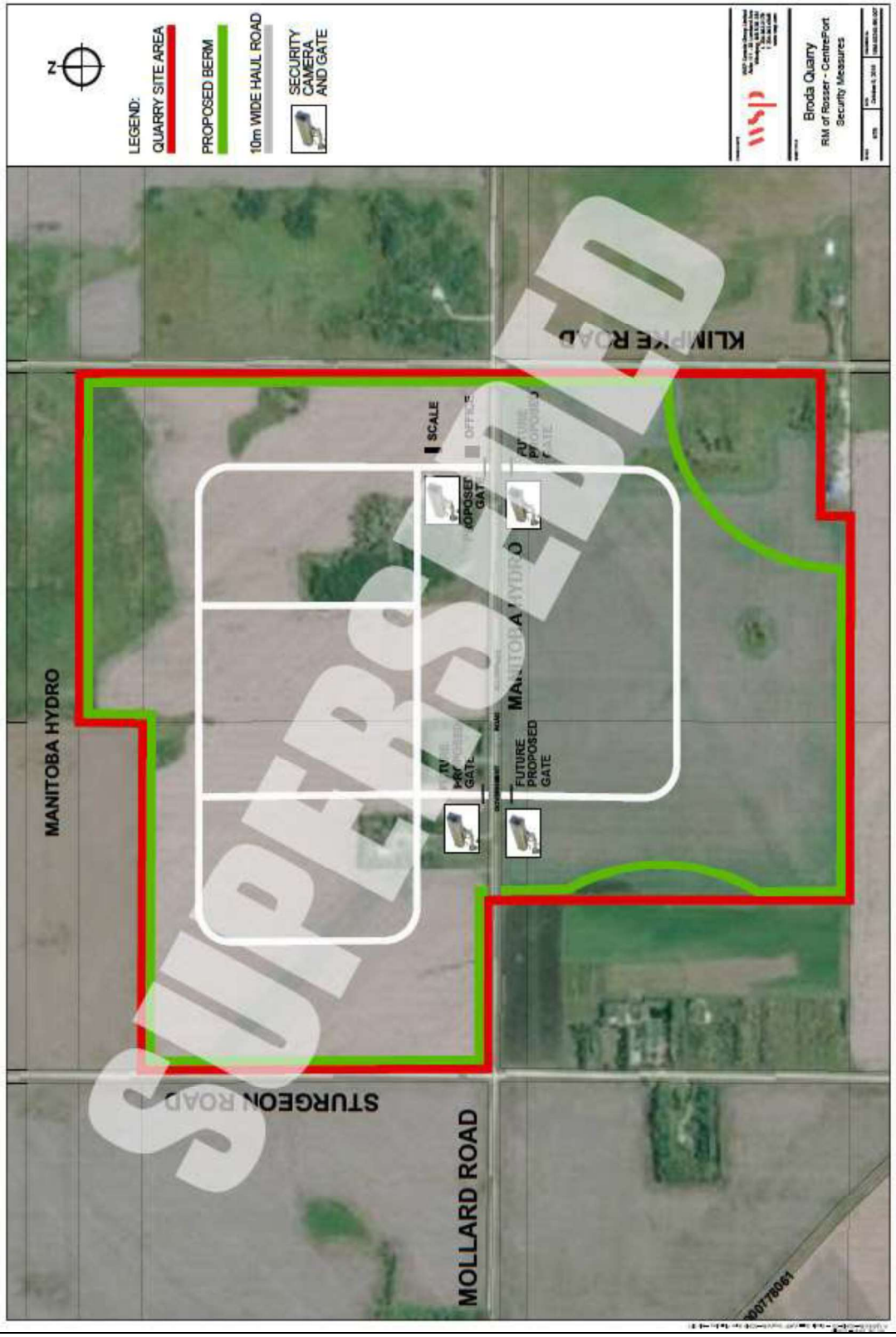

LEGEND:
QUARRY SITE AREA
800m BUFFER
Broda Quarry
RM of Rosser - CentrePort
Quarry Boundary
QUARRY SITE AREA
(APPROXIMATELY 57.5 ACRES)
400M BUFFER
400M BUFFER
MANITOBA HYDRO
TRUNK HIGHWAY 101
MOLLARD ROAD
FARMER AVENUE
000430653
SUPERSEDED

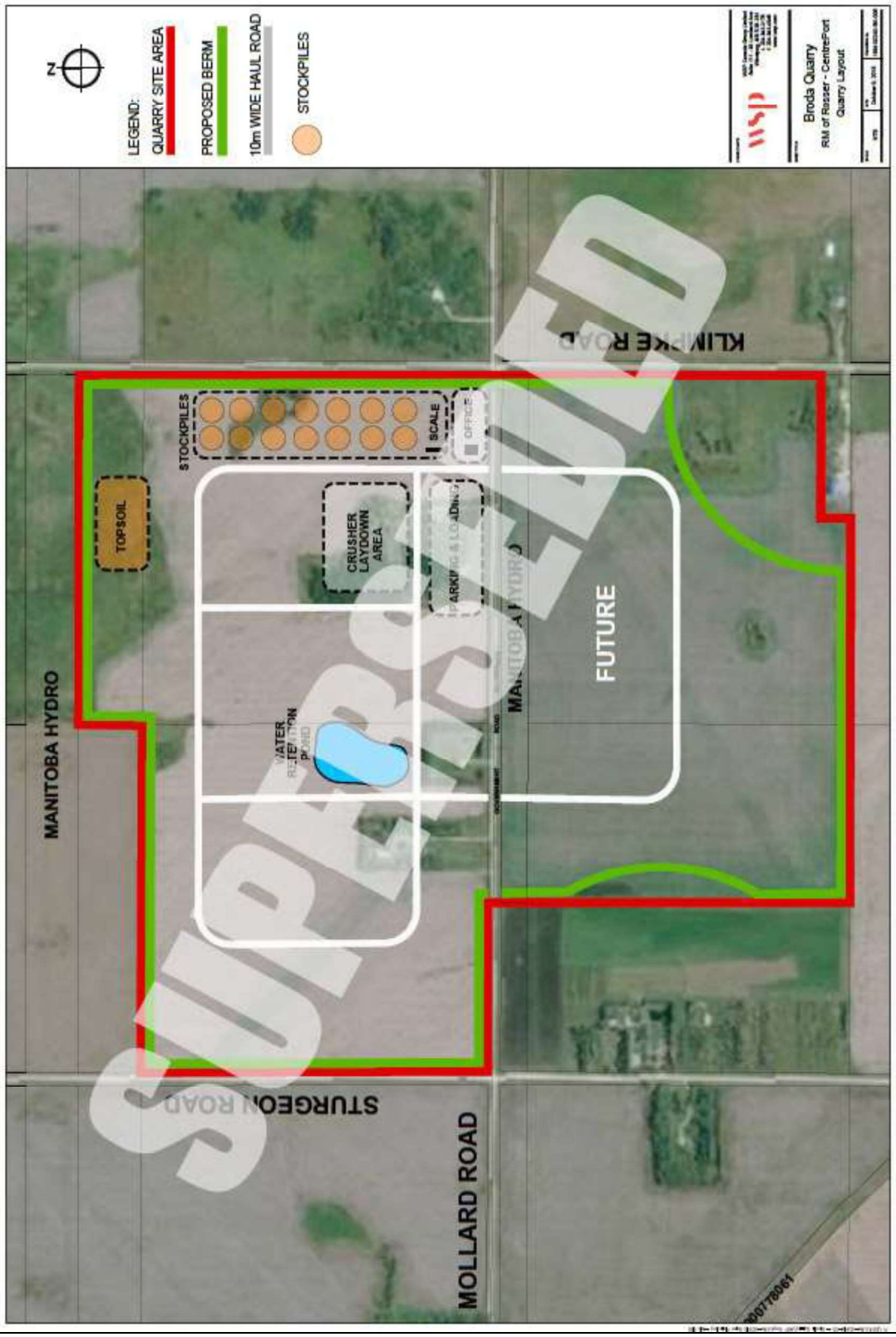

LEGEND:
QUARRY SITE AREA
Broda Quarry
RM of Rosser - CentrePort
Land Area and Excavation
MANITOBA HYDRO
PROPOSED QUARRY AREA = 2,326,942 Sq.m
APPROXIMATE DEPTH OF EXCAVATION = ±10 m
MOLLARD ROAD
SUPERSEDED


N
LEGEND:
QUARRY SITE AREA
Broda Quarry
RM of Rosser - CentrePort
Phasing
PHASE 1
PHASE 2
PHASE 3
PHASE 4
PHASE 5
MANITOBA HYDRO
MOLLARD ROAD
SUPERSEDED


N
LEGEND:
QUARRY SITE AREA
REHABILITATION AREA
Broda Quarry
RM of Rosser - CentrePort
Site Rehabilitation
MANITOBA HYDRO
MOLLARD ROAD
SUPERSEDED


N
LEGEND:
QUARRY SITE AREA
800m BUFFER
EXIST. BUILDINGS & STRUCTURES
wsp
Broda Quarry
RM of Rosser - CentrePort
Location of Existing Buildings & Structures
SUPERSEDED
TRUNK HIGHWAY 101
MANITOBA HYDRO
400M BUFFER
FARMER AVENUE
MOLLARD ROAD
400M BUFFER
0004306659


LEGEND:
QUARRY SITE AREA
PROPOSED BERM
10m WIDE HAUL ROAD
SECURITY CAMERA AND GATE
Broda Quarry
RM of Rosser - CentrePort
Security Measures
MANITOBA HYDRO
MOLLARD ROAD
FUTURE PROPOSED GATE
SUPERSEDED


N
LEGEND:
QUARRY SITE AREA
PROPOSED BERM
10m WIDE HAUL ROAD
STOCKPILES
wsp
Broda Quarry
RM of Rosser - CentrePort
Quarry Layout
STOCKPILES
SCALE
OFFICE
TOPSOIL
CRUSHER LAYDOWN AREA
FUTURE
MANITOBA HYDRO
MOLLARD ROAD
SUPERSEDED

APPENDIX B CONTINUOUS SURFACE MINER TECHNOLOGY

Wirtgen Technology and Models in Particular

From: https://www.wirtgen.de/en/technologies/application/surface-mining/surface_mining.php

As the surface miner moves forward, a special cutting drum rotates against the direction of travel, cutting layers of material from the rock formations and crushing it in the process. The primary conveyor picks up the material in the drum housing and transports it towards the rear of the machine, where it is then accepted by the slewable and height-adjustable discharge conveyor. The discharge conveyor loads the material into trucks or dumpers or discharges it to the side of the miner. The discharge height can be adjusted to the height of the transport vehicles. The surface miner is driven via four steerable and height-adjustable track units. An automatic levelling system ensures precise adherence to the cutting depth, thus enabling even thin seams or layers to be mined selectively and with maximum accuracy.

Strict environmental standards in terms of noise and dust emissions make the vibration-free surface mining process attractive in comparison to drilling and blasting. The stable, precise and level surfaces produced in mining, earthworks and rock operations are suitable for immediate use as pavements, slopes or tunnel floors.

From: https://media.wirtgen-group.com/media/02_wirtgen/media_1/media_1_06_surface_miners_2/media_1_06_surface_miners_2_00_general_information/W_brochure_Surface-Mining_0116_EN.pdf

The economical exploitation of primary resources in opencast mining is becoming increasingly difficult as the mineral content of many deposits is dwindling due to difficult geological conditions. In rock construction, machines are required for precise levelling operations under restricted space conditions. Our patent remedy in both cases is mechanical exploitation by means of surface mining. Being the innovative leader in this technology, Wirtgen is passionately driving the development of this economical and environmentally gentle process, using its expertise to successfully master the even more demanding challenges lying ahead.

We not only develop innovative machines of the highest quality. With our machine technology, we also constantly endeavour to keep environmental pollution as low as possible. A WIRTGEN surface miner is a perfect example of this philosophy: it impresses with its environmentally friendly technology as it cuts, crushes and loads rock in a single operation. A tremendous advantage of selective mining is that the vibrationless mining operation without drilling and blasting is accompanied by low levels of dust and noise. The low environmental impact also permits maximum exploitation of the deposit right up to the edge of residential areas. The selective mining of high-quality materials requires considerably less space than conventional mining methods. Our fuel-efficient, intelligently controlled engines comply with the strictest exhaust emission standards.

Figure B-1. A Wirtgen 4200SM Surface Miner.

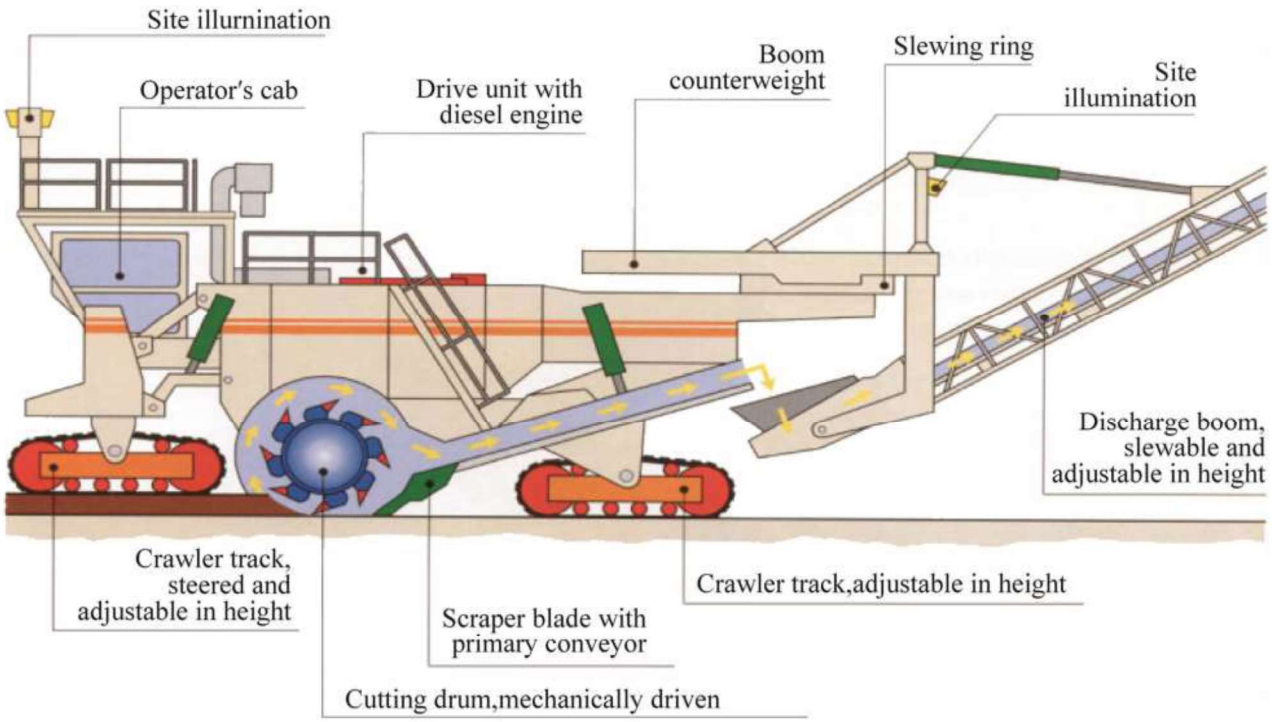


Figure B-2. A cross section of a Wirtgen surface miner in operation.

Figure B-3. A Wirtgen 4200SM Surface Miner.

Figure B-4. A Wirtgen 4200SM Surface Miner.

Figure B-5. A Wirtgen 2500SM Surface Miner.

Figure B-6. A Wirtgen 2500SM Surface Miner.

Appendix A – Certificate of Insurance

Barry Shelton

Marsh Canada Limited
301 PCS Tower, 122 First Avenue South
Saskatoon, Saskatchewan S7K 7E5
+1 306 683 6979
Fax +1 306 653 5090
barry.shelton@marsh.com
www.marsh.ca www.marsh.com

January 18, 2019

To Whom it May Concern

Re: Mr. Gord Broda
Broda Properties Inc.
North Perimeter Aggregates Inc.
RR2 Site 4 Comp. 207
Prince Albert, SK S6V 5P9

Subject: **Development Agreement - Commercial General Liability Insurance**

Marsh Canada Limited is duly licensed, admitted, and authorized to do business in the Province of Manitoba. In the event that Broda Properties Inc. and/or North Perimeter Aggregates Inc. finalizes a Development Agreement with your organization, Marsh Canada Limited anticipates no obstacles in providing the required coverage as follows to our valued client:

> Commercial General Liability insurance in an amount of not less than $5,000,000 per Occurrence and in the annual aggregate and naming the your organization as an additional insured;

I trust you will find the above in order, however, should you require anything further please do not hesitate to contact us.

Sincerely,

Barry Shelton
Vice President