

To: Peter Ming, Municipality of West Nipissing
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Date: January 13, 2021

Project #: 60628221

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Technical Memorandum

Subject: **Verner Water Servicing Improvements Municipal Class Environmental Assessment (MCEA) – Phase 2
Alternative Solutions**

The following table presents the evaluation framework and criteria for the Verner Water System Improvements MCEA. AECOM has completed a qualitative evaluation that ranks each category of criteria from least to most preferred based on the potential constraints with an overall ranking at the end of the table.

For Alternative 3, a separate matrix has been developed to evaluate the three routing options using the same criteria.

Table 1: Evaluation of Alternative Solutions

Category & Criteria		Alternative 1: Do Nothing	Alternative 2: Limit Growth	Alternative 3: Maintain or Upgrade the Existing Verner Water Treatment Plant (WTP) to receive water from Sturgeon Falls WTP via new Water Feedermain	Alternative 4: Upgrade the Existing Verner WTP – Maintain Veuve River Source	Alternative 5: Build a New Water Treatment Plant (WTP) at Cache Lake	Alternative 6: New Groundwater Supply
Details		<ul style="list-style-type: none"> Maintain existing conditions. No improvements are planned or undertaken. 	<ul style="list-style-type: none"> Assumes no improvements will be made beyond those already planned and approved and includes measures to limit development in the Study Area 	<ul style="list-style-type: none"> Route 1: CPR Corridor Route 2: Local Road Network Route 3: TransCanada Highway/Local Road Network 	<ul style="list-style-type: none"> Upgrade the Verner WTP to alternative treatment system. All works on existing site. 	<ul style="list-style-type: none"> Construct a new Water Treatment Plant at new source (Cache Lake) with low lift pumping station and feeder watermain (Highway 575) from WTP to Verner Water Tower. Potential new location for new WTP at north end of Guenette Road in new greenfield site. Potential service connections to residences along watermain route. 	<ul style="list-style-type: none"> Site new municipal well(s). Well target areas would be identified through hydro geological investigations.
Technical Environment	a. Raw and treated water quality considerations (existing Sturgeon Falls WTP vs new WTP at Cache Lake).	<ul style="list-style-type: none"> Maintains existing conditions – poor raw (Veuve River) and presents challenge to treat. 	<ul style="list-style-type: none"> Maintains existing conditions – poor raw (Veuve River) and presents challenge to treat. 	<ul style="list-style-type: none"> Significantly improved raw (Sturgeon River) and treated water quality (Sturgeon Falls WTP). 	<ul style="list-style-type: none"> Continued poor raw water quality (Veuve River). Improved treated water quality. 	<ul style="list-style-type: none"> Potential for poor raw and treated water quality based on small and shallow waterbody (Cache Lake). 	<ul style="list-style-type: none"> Potential poor raw water quality based on preliminary test well during 2005 Verner WTP upgrade. Potential for increased treatment to address potential poor groundwater quality.
	b. Potential degree of construction complexities, including number and type of water crossings, degree of required rock removal, access, staging and duration to build.	<ul style="list-style-type: none"> No construction involved – no complexity. 	<ul style="list-style-type: none"> No construction involved – no complexity. 	<ul style="list-style-type: none"> Moderate construction complexities related to WTP upgrades and Water Feedermain routing. Refer to Routing Evaluation for further details. Estimated 1-2 years to construct. 	<ul style="list-style-type: none"> Significant construction complexities related to WTP upgrades. Does not require Water Feedermain. Estimated 1-2 years to construct. Requires building expansion to address redundancy. 	<ul style="list-style-type: none"> Significant construction complexities related to a new WTP and associated Water Feedermain to Verner. Anticipate significant complexities related to rock removal on Highway 575 for Water Feedermain routing. Longer overall duration based on additional studies. Triggers Schedule C MCEA. 	<ul style="list-style-type: none"> Moderate construction complexities related to constructing new municipal well(s) and associated pumping infrastructure to community of Verner. Longest overall duration (2-3 years) related to completion of hydro geological target well area study, establishment of test wells, including MCEA Schedule C, which can add additional 1-2 years on top of construction).
	c. Potential effects on roadway and utility infrastructure.	<ul style="list-style-type: none"> No impacts to roadway and utility infrastructure. 	<ul style="list-style-type: none"> No impacts to roadway and utility infrastructure. 	<ul style="list-style-type: none"> Moderate impacts related to Water Feedermain routing. Refer to Routing Evaluation for further details. 	<ul style="list-style-type: none"> No impacts to roadway and utility infrastructure. 	<ul style="list-style-type: none"> New WTP may require significant hydro upgrades. Impacts related to construction of Water Feedermain to Verner via Highway 575. 	<ul style="list-style-type: none"> Moderate impacts related to linear infrastructure (dependent on municipal well site locations).

Low Impact is considered preferred compared to moderate or high impact.

Legend	Low Impact	Low to Moderate Impact	Moderate Impact	Moderate to High Impact	High Impact	Overall Most Preferred

Category & Criteria	Alternative 1: Do Nothing	Alternative 2: Limit Growth	Alternative 3: Maintain or Upgrade the Existing Verner Water Treatment Plant (WTP) to receive water from Sturgeon Falls WTP via new Water Feedermain	Alternative 4: Upgrade the Existing Verner WTP – Maintain Veuve River Source	Alternative 5: Build a New Water Treatment Plant (WTP) at Cache Lake	Alternative 6: New Groundwater Supply
d. Provides good site access for maintenance vehicles, future operation and maintenance and servicing.	▪ Not applicable.	▪ Not applicable.	▪ No access issues for the existing Verner WTP. ▪ Generally good accessibility for Water Feedermain dependent on route selected (refer to Routing Evaluation for further details).	▪ No access issues for the existing Verner WTP.	▪ No access issues for the new WTP. ▪ Potential access issues for Water Feedermain.	▪ No access issues for new municipal well(s).
e. Operation efficiency.	▪ Maintains status quo – current system is difficult to operate (i.e. meet established and future treated water quality parameters).	▪ Maintains status quo – current system is difficult to operate (i.e. meet established and future treated water quality parameters).	▪ Significantly improved operation efficiency – meets established and future water quality parameters. ▪ Requires pumping from Sturgeon Falls WTP to Verner WTP.	▪ Significantly improved operation efficiency – can easily meet established and future water quality parameters. ▪ New equipment processes will provide significant operational benefits.	▪ Significantly improved operation efficiency – meets established and future water quality parameters. ▪ Requires pumping from new WTP to Verner. ▪ New WTP will include newest technologies improving overall operations.	▪ Moderately improved operation efficiency; however, may be difficult to operate (i.e. meet established and future treated water quality parameters). ▪ Requires new operations agreement with OCWA. ▪ Introduces municipal groundwater supply, which West Nipissing has limited experience with.
f. Potential effects on traffic and railway operations.	▪ No impacts to traffic and railway operations.	▪ No impacts traffic and railway operations.	▪ Potential temporary impacts to traffic and railways operations. ▪ Water Feedermain dependent on route selected (refer to Routing Evaluation for further details).	▪ No impacts traffic and railway operations.	▪ Potential temporary impacts to traffic operations (Highway 575).	▪ Moderate impacts related to linear infrastructure (dependent on municipal well site locations).
g. Potential to maximize existing infrastructure.	▪ Does not maximize Sturgeon Falls WTP capacity and ability to supply treated water.	▪ Does not maximize Sturgeon Falls WTP capacity and ability to supply treated water.	▪ Maximizes existing Verner WTP.	▪ Maximizes existing Verner WTP. ▪ Requires building expansion to address redundancy.	▪ Does not maximize existing infrastructure.	▪ Does not maximize existing infrastructure.
h. Capacity availability to meet planned community growth.	▪ Existing system can not provide capacity to meet planned growth.	▪ Existing system can not provide capacity to meet planned growth.	▪ Meets planned community growth.	▪ Meets planned community growth.	▪ Meets planned community growth.	▪ Assumes insufficient quantity based on preliminary test well during 2005 Verner WTP upgrade.
i. Source water protection considerations.	▪ Maintains current Intake Protection Zone. ▪ No source water protection impacts related to construction.	▪ Maintains current Intake Protection Zone. ▪ No source water protection impacts related to construction.	▪ Consolidates source water protection to one Intake Protection Zone (Sturgeon Falls WTP).	▪ Maintains current Intake Protection Zone. ▪ No source water protection impacts related to construction.	▪ Requires new Intake Protection Zone (Cache Lake). ▪ Replaces Verner WTP Intake Protection Zone.	▪ Requires Wellhead Protection Zone. ▪ Replaces Verner WTP Intake Protection Zone.
Technical Environment Evaluation Ranking						

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Land Use	a. Potential to conform to approved local (e.g. OP), provincial (e.g. MTO, PPS) and federal (e.g. Transport Canada) plans and policies.	<ul style="list-style-type: none"> Does not meet planned growth as per Municipal Official Plan and PPS. Not consistent with PPS (i.e. maximizing existing infrastructure and meeting current and future servicing needs). 	<ul style="list-style-type: none"> Does not meet planned growth as per Municipal Official Plan and PPS. Not consistent with PPS (i.e. maximizing existing infrastructure and meeting current and future servicing needs). 	<ul style="list-style-type: none"> Meets planned growth as per Municipal Official Plan and PPS. 	<ul style="list-style-type: none"> Meets planned growth as per Municipal Official Plan. Not consistent with PPS (i.e. maximizing existing infrastructure before constructing new infrastructure). 	<ul style="list-style-type: none"> Meets planned growth as per Municipal Official Plan. Not consistent with PPS (i.e. maximizing existing infrastructure before constructing new infrastructure). 	<ul style="list-style-type: none"> Meets planned growth as per Municipal Official Plan. Not consistent with PPS (i.e. maximizing existing infrastructure before constructing new infrastructure).
	b. Potential effects on current and future land uses, including development plans.	<ul style="list-style-type: none"> No impacts to current and future land uses. 	<ul style="list-style-type: none"> No impacts to current and future land uses. 	<ul style="list-style-type: none"> Minor impacts to land uses related to Existing Verner WTP. Varying minor impacts related to lands adjacent to new Water Feedermain construction. Refer to Routing Evaluation for further details. 	<ul style="list-style-type: none"> Minor impacts to land uses related to Existing Verner WTP. 	<ul style="list-style-type: none"> Significant impacts to land uses – siting new WTP (dependent on siting location). For example, new greenfield site adjacent to residence/cottage Establishment of Intake Protection Zone may restrict existing and future land use. 	<ul style="list-style-type: none"> Minor impacts to construction of new municipal well(s). Establishment of Wellhead protection Zone may restrict existing and future land use.
	c. Anticipated site plan approval considerations.	<ul style="list-style-type: none"> No site plan required. 	<ul style="list-style-type: none"> No site plan required. 	<ul style="list-style-type: none"> No site plan required. 	<ul style="list-style-type: none"> No site plan required. 	<ul style="list-style-type: none"> Site plan required. 	<ul style="list-style-type: none"> Site plan required.
	Land Use Evaluation Ranking						
Natural Environment	a. Potential effects on terrestrial/aquatic habitat and species.	<ul style="list-style-type: none"> No impacts to terrestrial/aquatic habitat and species. 	<ul style="list-style-type: none"> No impacts to terrestrial/aquatic habitat and species. 	<ul style="list-style-type: none"> No impacts to terrestrial/aquatic habitat and species related to WTP. Moderate impacts related to Water Feedermain routing, including water crossings. Refer to Routing Evaluation for further details. 	<ul style="list-style-type: none"> No impacts to related to WTP. Does not require Water Feedermain. 	<ul style="list-style-type: none"> Significant impacts to terrestrial/aquatic habitat and species related to new WTP and new intake. Tree removals required. 	<ul style="list-style-type: none"> Moderate impacts to terrestrial/aquatic habitat and species related to siting new municipal well(s). Moderate impacts related to Water Feedermain routing, including water crossings.
	b. Potential effects on species at risk (SAR) and SAR habitat.	<ul style="list-style-type: none"> No impacts to SAR and SAR habitat. 	<ul style="list-style-type: none"> No impacts to SAR and SAR habitat. 	<ul style="list-style-type: none"> No impacts to SAR and SAR habitat related to WTP. Moderate impacts to SAR and SAR habitat related to Water Feedermain routing, including water crossings. Refer to Routing Evaluation for further details. 	<ul style="list-style-type: none"> No impacts to SAR and SAR habitat related to WTP. Does not require Water Feedermain. 	<ul style="list-style-type: none"> Significant impacts to SAR and SAR habitat related to new WTP and new intake. 	<ul style="list-style-type: none"> Moderate impacts to SAR and SAR habitat related to siting new municipal well(s). Moderate impacts to SAR and SAR habitat related to linear infrastructure routing, including water crossings.

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Category & Criteria		Alternative 1: Do Nothing	Alternative 2: Limit Growth	Alternative 3: Maintain or Upgrade the Existing Verner Water Treatment Plant (WTP) to receive water from Sturgeon Falls WTP via new Water Feedermain	Alternative 4: Upgrade the Existing Verner WTP – Maintain Veuve River Source	Alternative 5: Build a New Water Treatment Plant (WTP) at Cache Lake	Alternative 6: New Groundwater Supply
Natural Environment	c. Potential to encounter soil and water contamination and waste disposal.	▪ No impacts.	▪ No impacts.	▪ No impacts related to WTP. ▪ Moderate potential to encounter contaminated soil and groundwater if CPR Water Feedermain is preferred. ▪ Refer to Routing Evaluation for further details.	▪ No impacts related to WTP.	▪ No impacts considering existing and historical land uses for potential WTP site. ▪ No impacts related to Water Feedermain within existing right-of-way. ▪ Waste management may include on site treatment or haulage.	▪ No impacts related to siting new municipal well(s). ▪ Waste management may include on site treatment or haulage.
	d. Anticipated environmental permitting and approval considerations.	▪ No environmental permits or approvals required.	▪ No environmental permits or approvals required.	▪ No environmental permits or approvals anticipated. ▪ Anticipate straight forward permitting and approvals related to new Water Feedermain. ▪ Refer to Routing Evaluation for further details.	▪ Potential to require PTTW related to dewatering. Does not require Water Feedermain.	▪ Complicated permits/approvals required – PTTW, ECA	▪ Complicated permits/approvals required – PTTW, ECA
	e. Potential effects on surface water and groundwater due to construction (i.e. dewatering of trenches during installation of feeder watermain, control of erosion and sedimentation, construction and/or dredging at intake locations).	▪ No impacts to surface water and groundwater due to construction.	▪ No impacts to surface water and groundwater due to construction.	▪ No impacts to surface water and groundwater due to construction related to existing Verner WTP. ▪ Low impacts to surface water and groundwater related to new Water Feedermain. ▪ Refer to Routing Evaluation for further details.	▪ No impacts to surface water and groundwater due to construction related to upgrading existing Verner WTP. ▪ Does not require Water Feedermain.	▪ Significant impacts to surface water and groundwater due to construction related to construction of new WTP (e.g. dewatering and intake).	▪ Low impacts to surface water and groundwater due to construction related to siting new municipal well(s) compared to siting new WTP (Alternative 5). ▪ Low impacts to surface water and groundwater related to associated linear infrastructure.
	Natural Environment Evaluation Ranking						
Socio-Economic Environment	a. Potential nuisance impacts (e.g., disruption to access, air, dust, noise and vibration) from construction and operations.	▪ No nuisance impacts.	▪ No nuisance impacts	▪ Minor nuisance impacts related to upgrading existing WTP. ▪ Moderate impacts – short term disruptions related to new Water Feedermain routing. ▪ Refer to Routing Evaluation for further details.	▪ Moderate nuisance impacts related to upgrading the existing WTP.	▪ Significant nuisance impacts related to construction of a new WTP.	▪ Minor nuisance impacts related to constructing new municipal well(s) compared to siting New WTP (Alternative 5). ▪ Minor impacts – short term disruptions related to associated linear infrastructure based on works within existing right-of-way (Highway 575).
	b. Potential property requirements (temporary and permanent).	No property required.	▪ No property required.	▪ No property required.	▪ No property required.	▪ Significant property purchase required for a new WTP at Cache Lake.	▪ Property purchase required for siting new municipal well(s).

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Climate Change	Socio-Economic Environment Evaluation Ranking						
	a. Potential carbon footprint (e.g. energy usage, use of construction materials, construction methods and operations).	<ul style="list-style-type: none"> No impacts. 	<ul style="list-style-type: none"> No impacts. 	<ul style="list-style-type: none"> Moderate energy use related to pumping from Sturgeon Falls to existing Verner WTP. Does not require new building. Construction limited to excavation for new Water Feedermain. 	<ul style="list-style-type: none"> Similar energy use as existing WTP. Requires building expansion to address redundancy. 	<ul style="list-style-type: none"> Significant energy use related to operating new WTP and pumping to Verner (energy use offset by decommissioning existing Verner WTP). Requires constructing new WTP. 	<ul style="list-style-type: none"> Moderate energy use related to new municipal well(s) and pumping to Verner. Requires constructing small wellhouse building.
	b. Potential resilience to extreme weather events.	<ul style="list-style-type: none"> Existing Verner WTP intake susceptible to low Veuve River water levels during draught conditions. 	<ul style="list-style-type: none"> Existing Verner WTP intake susceptible to low Veuve River water levels during draught conditions. 	<ul style="list-style-type: none"> Pumping related to Sturgeon Falls WTP can be impacted by extreme weather events (e.g. loss of power). Existing WTP has standby power component. 	<ul style="list-style-type: none"> Pumping related to Existing Verner WTP can be impacted by extreme weather events (e.g. loss of power). Intake performance can be affected by low Veuve River water levels during draught conditions. Upgrades will include standby power component. 	<ul style="list-style-type: none"> Pumping related to new WTP can be impacted by extreme weather events (e.g. loss of power). Intake performance can be affected by low Veuve River water levels during draught conditions. New WTP will include standby power component. 	<ul style="list-style-type: none"> Pumping related to new municipal well can be impacted by extreme weather events (e.g. loss of power). Groundwater aquifer may be impacted by draught conditions. Municipal well sites will include standby power component.
Climate Change Evaluation Ranking							
Cultural Environment	a. Potential effects on archaeological resources.	<ul style="list-style-type: none"> No impacts to archaeological resources. 	<ul style="list-style-type: none"> No impacts to archaeological resources. 	<ul style="list-style-type: none"> Potential impacts to archaeological resources related to Water Feedermain routing if placed outside of disturbed right-of-way (e.g. CPR Corridor). Refer to Routing Evaluation for further details. 	<ul style="list-style-type: none"> No impacts to archaeological resources. 	<ul style="list-style-type: none"> Potential impacts to archaeological resources based on construction of a new WTP. 	<ul style="list-style-type: none"> Potential impacts to archaeological resources related to siting new municipal well(s).
	b. Potential for disruption of built heritage resources and cultural heritage landscapes.	<ul style="list-style-type: none"> No impacts to built heritage resources and cultural heritage landscapes. 	<ul style="list-style-type: none"> No impacts to built heritage resources and cultural heritage landscapes. 	<ul style="list-style-type: none"> Potential impacts to built heritage resources and cultural heritage landscapes. Refer to Routing Evaluation for further details. 	<ul style="list-style-type: none"> No impacts to built heritage resources and cultural heritage landscapes. 	<ul style="list-style-type: none"> Potential impacts to built heritage resources and cultural heritage landscapes. 	<ul style="list-style-type: none"> Potential impacts to built heritage resources and cultural heritage landscapes.
	Cultural Environment Evaluation Ranking						

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Cost	a. Cost of construction (including property acquisition).	▪ No costs.	▪ No costs.	▪ Moderate costs (~\$10M).	▪ Lower costs (~\$3-5M).	▪ High costs – new WTP and associated linear infrastructure has estimate cost of ~\$14-15M, which includes property acquisition.	▪ Lower costs (~\$4M).
	b. Cost of operation / maintenance.	▪ No costs.	▪ No costs.	▪ Moderate operation/ maintenance costs.	▪ Moderate operation/ maintenance costs.	▪ High operation/ maintenance costs.	▪ Moderate operation/ maintenance costs.
	Cost Evaluation Ranking						
Overall Evaluation Ranking							

For Internal Use Only – Overall Evaluation Scoring

Category	Scoring Weight (/100)	Alternative 1: Do Nothing	Alternative 2: Limit Growth	Alternative 3: Maintain or Upgrade the Existing Verner Water Treatment Plant (WTP) to receive water from Sturgeon Falls WTP via new Water Feedermain	Alternative 4: Upgrade the Existing Verner WTP – Maintain Veuve River Source	Alternative 5: Build a New Water Treatment Plant (WTP) at Cache Lake	Alternative 6: New Groundwater Supply
Technical Environment	30	12	12	30	24	18	12
Land Use	10	6	6	10	6	2	4
Natural Environment	10	10	10	8	6	4	6
Socio Economic Environment	10	10	10	8	6	2	6
Climate Change	10	10	10	8	6	2	6
Cultural Environment	10	10	10	8	10	6	6
Cost	20	20	20	12	16	2	16
Overall Score	Total: 100	78	78	84	74	36	56

Evaluation Ranking for each Category combines a) Scoring Weight and b) Pie Scoring Method where Low Impact = 5/5; Low to Moderate Impact = 4/5; Moderate Impact = 3/5; Moderate to High Impact = 2/5; High Impact = 1/5

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Table 2: Evaluation of Water Feedermain Routes







Category & Criteria		Route 1: CPR Corridor	Route 2: Local Road Network	Route 3: TransCanada Highway/Local Road Network
Details		<ul style="list-style-type: none"> Water Feedermain Route 1 follows the Canadian Pacific Railway (CPR) Corridor approximately 13 km from Cache Street in Cache Bay to the current Verner WTP. 	<ul style="list-style-type: none"> Water Feedermain Route 2 follows Highway 17 west from Levac Road 15 km before joining Gingras Avenue and the CPR Corridor in Verner to access the current Verner WTP. 	<ul style="list-style-type: none"> Water Feedermain Route 3 follows Levac Road west from Highway 17 to Beaudry Road before turning north and following Highway 64 for approximately 15 km in order to reach the CPR Corridor in Verner, which is used to access the current Verner WTP.
Technical Environment	a. Potential degree of construction complexities, including number and type of water crossings, degree of required rock removal, access, staging and duration to build.	<ul style="list-style-type: none"> Moderate construction complexities related to coordination and construction within an active rail corridor. Ongoing coordination required with CPR to facilitate the construction (Estimated 6 train movements a day) Route consists of 16 water crossings that overlap fish habitat. Estimated 1 year to construct. 	<ul style="list-style-type: none"> Moderate construction complexities related to relatively low traffic volumes on local roads (with exception of Highway 64) and significant rock removal. Route crosses CPR corridor. Route consists of 16 water crossings that overlap fish habitat. Estimated 1-2 years to construct. 	<ul style="list-style-type: none"> Higher level of construction complexities related to high traffic volumes on TransCanada Highway and significant rock removal. Route consists of 24 water crossings that overlap fish habitat. Estimated 1-2 years to construct.
	b. Potential effects on roadway and utility infrastructure.	<ul style="list-style-type: none"> Moderate impacts related to Water Feedermain routing. Minimal utility conflicts. 	<ul style="list-style-type: none"> Moderate impacts related to Water Feedermain routing within right-of-way. Greater potential for utility conflicts. 	<ul style="list-style-type: none"> Moderate impacts related to Water Feedermain routing within right-of-way. Greater potential for utility conflicts.
	c. Provides good site access for maintenance vehicles, future operation and maintenance and servicing.	<ul style="list-style-type: none"> Generally good accessibility for Water Feedermain. Requires coordination with CPR for operations and maintenance. 	<ul style="list-style-type: none"> Generally good accessibility for Water Feedermain. Works generally within local road network right-of-way. 	<ul style="list-style-type: none"> Generally good accessibility for Water Feedermain. Requires coordination with MTO for operations and maintenance. All works within TransCanada Highway and local road network right-of-way.
	d. Operation efficiency.	<ul style="list-style-type: none"> Good operation efficiency based on shorter route. 	<ul style="list-style-type: none"> Poor operation efficiency based on longer route. 	<ul style="list-style-type: none"> Good operation efficiency based on shorter route.
	e. Potential effects on traffic and railway operations during construction.	<ul style="list-style-type: none"> Potential temporary impacts to CP railway operations during construction – requires coordination of construction timing and flagmen. Avoids temporary lane closures for traffic. 	<ul style="list-style-type: none"> Potential temporary impacts to local road network traffic, as well as Highway 64. Potential for temporary lane closures. 	<ul style="list-style-type: none"> Potential temporary impacts to TransCanada Highway (higher traffic volumes) and local road network traffic. Potential for temporary lane closures.
	f. Technical Permitting and Approvals	<ul style="list-style-type: none"> CPR supports concept of installing Water Feedermain within corridor right-of-way. Requires CPR agreement. 	<ul style="list-style-type: none"> Works generally within local road network right-of-way. Requires MTO approval related to encroachment permit for Highway 64 and traffic management plan. 	<ul style="list-style-type: none"> Anticipate difficult MTO approvals related to encroachment permit and traffic management plan.
	Technical Environment Evaluation Ranking			

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Natural Environment	<p>a. Potential effects on terrestrial/aquatic habitat and species.</p>	<p>Terrestrial Environment</p> <ul style="list-style-type: none"> ▪ Route 1 is approximately 13 km in length. ▪ There were no ANSIs, significant woodland, or environmentally significant areas identified within 120 m of the alternative. ▪ Route 1 is immediately adjacent to the Cache Bay PSW as well as one unevaluated wetland and may be affected by vegetation removal, dewatering activities, sedimentation and erosion, and soil and water contamination. ▪ The majority of the vegetation found within 120 m of Route 1 was culturally disturbed and characterized by agricultural fields which represented 43% of the study area as well as shrub thickets which represented 18%. Approximately 9% and 3% of the Project Study Area were also represented by deciduous forest and coniferous forest respectively. Less than 1% consisted of a meadow marsh community. Minimal vegetation removal is anticipated for the open cut segments of the alternative route 1 to be limited within the existing CPR Corridor Right-of-way (ROW) which is predominately already disturbed, however a portion of this route north of Leclair road contains natural vegetation within close proximity to the railway line. Other indirect effects to vegetation may include: accidental intrusion/damage, soil and sediment erosion, groundwater and soil contamination, dewatering effects, and introduction and spread of invasive species. ▪ There were 14 candidate SWH and one confirmed SWH within 120 m of Route 1; however, the majority of these SWHs are not anticipated to be affected as the proposed works will be limited within the existing CPR Corridor ROW which is already disturbed. The one confirmed SWH however is for the habitat of Black Ash which may be disturbed by vegetation removal. ▪ Wildlife, including bats(MBCA protected breeding birds and SOCC may be affected by vegetation removal via habitat loss, potential displacement or disturbance, or construction related injury or mortality. <p>Aquatic Environment</p> <ul style="list-style-type: none"> ▪ Route 1 has 16 water crossings that overlap fish habitat. Six of these crossings are across drains that require site visits to confirm if they are fish habitat or not. Work in/near water could potentially impact fish and fish habitat via the following: ▪ Potential changes in sediment and / or contaminant concentrations in the event of the release of sediment and / or deleterious substances to the watercourse. ▪ Potential changes to habitat structure and / or cover as a 	<p>Terrestrial Environment</p> <ul style="list-style-type: none"> ▪ Route 2 is approximately 15 km in length. ▪ There were no ANSIs, significant woodland, PSWs or environmentally significant areas within 120 m of the alternative. ▪ This route was characterized predominately by agricultural fields which comprise 43% of the study area of Route 2 with a mix of shrub thickets (10%), coniferous forest (6%), deciduous forest (3%) and rock barren (2%). Minimal vegetation removal is anticipated for the open cut segments of the proposed Route 2 to be limited within the existing road ROWs which are already disturbed. Other indirect effects to vegetation may include: accidental intrusion/damage, soil and sediment erosion, groundwater and soil contamination, dewatering effects, and introduction and spread of invasive species. ▪ There were eight candidate SWH and one confirmed SWH within 120 m of the Route 2; however, the majority of these SWHs are not anticipated to be affected as the proposed works will be limited within the existing road ROW which is already disturbed. The potential does exist along this route however for Rock Barren SWH to be affected as it is located directly adjacent to the road ROW. Additionally, the one confirmed SWH along this route is for the habitat of Black Ash which may be disturbed by vegetation removal. ▪ Wildlife, including bats, MBCA protected breeding birds and SOCC may be affected by vegetation removal via habitat loss, potential displacement or disturbance, or construction related injury or mortality. <p>Aquatic Environment</p> <ul style="list-style-type: none"> ▪ Route 2 has 16 water crossings that overlap fish habitat. Five of these crossings are across drains that require site visits to confirm if they are fish habitat or not. Work in/near water could potentially impact fish and fish habitat via the following: ▪ Potential changes in sediment and / or contaminant concentrations in the event of the release of sediment and / or deleterious substances to the watercourse. ▪ Potential changes to habitat structure and / or cover as a result of the removal and / or alteration of riparian vegetation. ▪ Potential for changes in baseflow or water temperatures as a result of alterations of groundwater flows to surface water and / or changes in slope or drainage. ▪ Potential changes in food and / or nutrient concentrations as a result of the removal and / or alteration of riparian vegetation. ▪ These changes could result in alteration and/or loss of habitat and habitat function, or displacement, harm or mortality to fish. 	<p>Terrestrial Environment</p> <ul style="list-style-type: none"> ▪ Route 3 is approximately 15 km in length. ▪ Route 3 is located within west Nipissing Official Plan Regulation Limits. ▪ There were no ANSIs, significant woodland, provincially PSWs or environmentally significant areas within 120 m of Route 3. ▪ This route was characterized by being dominated by field (36%) and shrub (17%) communities with some areas of Coniferous (6%), deciduous (4%) and mixed forests (3%) as well as rock barren (<1%). Minimal vegetation removal is anticipated for the open cut segments of the proposed Route 3 will be limited within the existing road ROW which is already disturbed. Other indirect effects to vegetation may include: accidental intrusion/damage, soil and sediment erosion, groundwater and soil contamination, dewatering effects, and introduction and spread of invasive species. ▪ There were seven candidate SWH and one confirmed SWH within 120 m of the Route 3; however, the majority of these SWHs are not anticipated to be affected as the proposed works will be limited within the existing road ROW which is already disturbed. The one confirmed SWH however is for the habitat of Black Ash which may be disturbed by vegetation removal. ▪ Wildlife, including bats, MBCA protected breeding birds and SOCC may be affected by vegetation removal via habitat loss, potential displacement or disturbance, or construction related injury or mortality. <p>Aquatic Environment</p> <ul style="list-style-type: none"> ▪ Route 3 has 24 water crossings that overlap fish habitat. Two of these crossings are across drains that require site visits to confirm if they are fish habitat or not. Work in/near water could potentially impact fish and fish habitat via the following: ▪ Potential changes in sediment and / or contaminant concentrations in the event of the release of sediment and / or deleterious substances to the watercourse. ▪ Potential changes to habitat structure and / or cover as a result of the removal and / or alteration of riparian vegetation. ▪ Potential for changes in baseflow or water temperatures as a result of alterations of groundwater flows to surface water and / or changes in slope or drainage. ▪ Potential changes in food and / or nutrient concentrations as a result of the removal and / or alteration of riparian vegetation. ▪ These changes could result in alteration and/or loss of habitat and habitat function, or displacement, harm or mortality to fish. ▪ This assessment assumes anticipated trenchless jack-and-bore drilling method of installation.
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Legend	Low Impact	Low to Moderate Impact	Moderate Impact	Moderate to High Impact	High Impact	Overall Most Preferred
						







Category & Criteria		Route 1: CPR Corridor	Route 2: Local Road Network	Route 3: TransCanada Highway/Local Road Network
Natural Environment		<p>result of the removal and / or alteration of riparian vegetation.</p> <ul style="list-style-type: none"> Potential for changes in baseflow or water temperatures as a result of alterations of groundwater flows to surface water and / or changes in slope or drainage. Potential changes in food and / or nutrient concentrations as a result of the removal and / or alteration of riparian vegetation. These changes could result in alteration and/or loss of habitat and habitat function, or displacement, harm or mortality to fish. This assessment assumes anticipated trenchless jack-and-bore drilling method of installation. 	<ul style="list-style-type: none"> This assessment assumes anticipated trenchless jack-and-bore drilling method of installation. 	
	b. Potential degree of construction complexities, including number and type of water crossings, degree of required rock removal, access, staging and duration to build.	<p>Terrestrial Environment</p> <ul style="list-style-type: none"> The following terrestrial SAR and their habitat may potentially occur in or within 120 m of the Route 1 based on identified ELC from aerial photo interpretation: <ul style="list-style-type: none"> Threatened (THR): 6 (Barn Swallow, Bobolink, Chimney Swift, Eastern Meadowlark, Eastern Whip-poor-will, and Blanding's Turtle) Endangered (END): 3 (Little Brown Myotis, Northern Myotis and Tri-coloured Bat). Bat SAR and their habitats may be affected if tree removal is required along edges of forested ecosites. Additional surveys (e.g., searches for maternity roosting structures, acoustic monitoring) and permits under the ESA may be required. Nesting habitat for Chimney Swift is not anticipated to be affected as no buildings are anticipated to be demolished. Barn Swallow often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. As such, surveys should be conducted to determine the presence of Barn Swallow on structures such as bridges that may be affected by proposed work. If determined to be present permits under the ESA will be required. Blanding's Turtles live in shallow water, usually in large wetlands and shallow lakes with aquatic vegetation. While suitable communities are not directly present within the study area, Blanding's Turtles are highly mobile however and may travel through the Project Study Area in association with stream crossings. There may be a risk of accidental injury and mortality to Blanding's Turtles associated with construction activities if proper mitigation are not implemented. Bobolink and Eastern Meadowlark often use similar 	<p>Terrestrial Environment</p> <ul style="list-style-type: none"> The following terrestrial SAR and their habitat may potentially occur in or within 120 m of the Alternative 2 based on identified ELC from aerial photo interpretation: <ul style="list-style-type: none"> Threatened (THR): 6 (Barn Swallow, Bobolink, Chimney Swift, Eastern Meadowlark, Eastern Whip-poor-will, and Blanding's Turtle) Endangered (END): 3 (Little Brown Myotis, Northern Myotis and Tri-coloured Bat). Bat SAR and their habitats may be affected if tree removal is required along edges of forested ecosites. Additional surveys (e.g., searches for maternity roosting structures, acoustic monitoring) and permits under the ESA may be required. Nesting habitat for Chimney Swift is not anticipated to be affected as no buildings are anticipated to be demolished. Barn Swallow often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. As such, surveys should be conducted to determine the presence of Barn Swallow on structures such as bridges that may be affected by proposed work. If determined to be present permits under the ESA will be required. Blanding's Turtles live in shallow water, usually in large wetlands and shallow lakes with aquatic vegetation. While suitable communities are not directly present within the Project Study Area, Blanding's Turtles are highly mobile however and may travel through the Project Study Area in association with stream crossings. There may be a risk of accidental injury and mortality to Blanding's Turtles associated with construction activities if proper mitigation are not implemented. Bobolink and Eastern Meadowlark often use similar habitats (grasslands, pastures, hayfields) for nesting and may be 	<p>Terrestrial Environment</p> <ul style="list-style-type: none"> The following terrestrial SAR and their habitat may potentially occur in or within 120 m of the Route 3 based on identified ELC from aerial photo interpretation: <ul style="list-style-type: none"> Threatened (THR): 6 (Barn Swallow, Bobolink, Chimney Swift, Eastern Meadowlark, Eastern Whip-poor-will, and Blanding's Turtle) Endangered (END): 3 (Little Brown Myotis, Northern Myotis and Tri-coloured Bat). Bat SAR and their habitats may be affected if tree removal is required along edges of forested ecosites. Additional surveys (e.g., searches for maternity roosting structures, acoustic monitoring) and permits under the ESA may be required. Nesting habitat for Chimney Swift is not anticipated to be affected as no buildings are anticipated to be demolished. Barn Swallow ooften live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. As such, surveys should be conducted to determine the presence of Barn Swallow on structures such as bridges that may be affected by proposed work. If determined to be present permits under the ESA will be required. Blanding's Turtles live in shallow water, usually in large wetlands and shallow lakes with aquatic vegetation. While suitable communities are not directly present within the study area, Blanding's Turtles are highly mobile however and may travel through the Project Study Area in association with stream crossings. There may be a risk of accidental injury and mortality to Blanding's Turtles associated with construction activities if proper mitigation are not implemented. Bobolink and Eastern Meadowlark often use similar habitats (grasslands, pastures, hayfields) for nesting and may be affected if these areas are cleared. If

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Legend	Low Impact	Low to Moderate Impact	Moderate Impact	Moderate to High Impact	High Impact	Overall Most Preferred
						

Category & Criteria		Route 1: CPR Corridor	Route 2: Local Road Network	Route 3: TransCanada Highway/Local Road Network	
Natural Environment		<p>habitats (grasslands, pastures, hayfields) for nesting and may be found within suitable agricultural fields located throughout the Project Study Area and may be affected if these areas are cleared. If clearing or degradation of these areas is expected, additional surveys (e.g., confirmation of suitable agricultural fields and presence/absence surveys) and permits under the ESA may be required.</p> <ul style="list-style-type: none"> Eastern Whip-poor-will may be found in forested ecosites with open areas. If clearing or degradation of these areas is expected, additional surveys (e.g. Eastern Whip-poor-will presence/absence searches) and permits under the ESA may be required. Least Bittern has been determined to have a low probability of being present within the study area due to an absence of habitat and as such no potential effects are expected. <p>Aquatic Environment</p> <ul style="list-style-type: none"> The potential to encounter aquatic SAR in or within 120m of Route 1 is low based on SAR range maps. Cache Bay on Lake Nipissing and its tributaries are potential habitat for Silver Lamprey (SC under SARA and ESA) and Northern Brook Lamprey (SC under SARA and ESA). Work near water could potentially result in effects (listed above) to fish and fish habitat (including SOCC) without the application of mitigation and protection measures. 	<p>found within suitable agricultural fields located throughout the Project Study Area and may be affected if these areas are cleared. If clearing or degradation of these areas is expected, additional surveys (e.g., confirmation of suitable agricultural fields and presence/absence surveys) and permits under the ESA may be required.</p> <ul style="list-style-type: none"> Eastern Whip-poor-will may be found in forested ecosites with open areas. If clearing or degradation of these areas is expected, additional surveys (e.g., Whip-poor-will presence/absence searches) and permits under the ESA may be required. Least Bittern has been determined to have a low probability of being present within the study area due to an absence of habitat and as such no potential effects are expected. <p>Aquatic Environment</p> <ul style="list-style-type: none"> Lake Sturgeon (THR under SARA, END under ESA) is the only aquatic SAR that may potentially occur or has habitat that may occur in or within 120 m of the Route 2 based on SAR range maps Cache Bay on Lake Nipissing and its tributaries are potential habitat for Silver Lamprey (SC under SARA and ESA), Northern Brook Lamprey (SC under SARA and ESA). Work near water could potentially result in effects (listed above) to fish and fish habitat (including SAR/SOCC) without the application of mitigation and protection measures. 	<p>clearing or degradation of these areas is expected, additional surveys (e.g., confirmation of suitable agricultural fields and presence/absence surveys) and permits under the ESA may be required.</p> <ul style="list-style-type: none"> Eastern Whip-poor-will may be found in forested ecosites with open areas. If clearing or degradation of these areas is expected, additional surveys (e.g., Whip-poor-will presence/absence searches) and permits under the ESA may be required. Least Bittern has been determined to have a low probability of being present within the study area due to an absence of habitat and as such no potential effects are expected. <p>Aquatic Environment</p> <ul style="list-style-type: none"> The potential to encounter aquatic SAR in or within 120m of Route 3 is low based on SAR range maps Cache Bay on Lake Nipissing and its tributaries are potential habitat for Silver Lamprey (SC under SARA and ESA), and Northern Brook Lamprey (SC under SARA and ESA) Work near water could potentially result in effects (listed above) to fish and fish habitat (including SOCC) without the application of mitigation and protection measures. 	
	c.	Potential to encounter soil and water contamination and waste disposal.	<ul style="list-style-type: none"> Moderate potential to encounter contaminated soil and groundwater if CPR Water Feedermain is preferred. 	<ul style="list-style-type: none"> Low potential to encounter contaminated soil and groundwater based on works within existing right-of-way. 	<ul style="list-style-type: none"> Low potential to encounter contaminated soil and groundwater based on works within existing right-of-way.
	d.	Anticipated environmental permitting and approval considerations.	<ul style="list-style-type: none"> Authorization under the Endangered Species Act, 2007 (ESA) may be required for potential SAR identified above, but especially for tree removal within bat SAR habitat (Forested Communities). DFO assessment may be required if works are proposed below the High Water Mark (HWM) of waterbodies or where applicable measures to protect fish and fish habitat or Codes of Practice for work near water cannot be implemented. Development and site alteration to adjacent lands of the Cache Bay PSW may require an EIS to determine no negative impacts upon the wetland as per the Municipality of West Nipissing Official Plan or the MNRF. A work permit under the PPCRA is not anticipated for 	<ul style="list-style-type: none"> Authorization under the Endangered Species Act, 2007 (ESA) may be required for potential SAR identified above, but especially for tree removal within bat SAR habitat (Forested Communities). DFO assessment may be required if works are proposed below the High Water Mark (HWM) of waterbodies or where applicable measures to protect fish and fish habitat or Codes of Practice for work near water cannot be implemented 	<ul style="list-style-type: none"> Authorization under the Endangered Species Act, 2007 (ESA) may be required for potential SAR identified above, but especially for tree removal within bat SAR habitat (Forested Communities). DFO assessment may be required if works are proposed below the High Water Mark (HWM) of waterbodies or where applicable measures to protect fish and fish habitat or Codes of Practice for work near water cannot be implemented







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Legend	Low Impact	Low to Moderate Impact	Moderate Impact	Moderate to High Impact	High Impact	Overall Most Preferred
						

Category & Criteria		Route 1: CPR Corridor	Route 2: Local Road Network	Route 3: TransCanada Highway/Local Road Network
Natural Environment		Route 1 provided that work is limited within the CPR rail corridor and does not encroach on the boundary limits of the Cache Bay Wetland Conservation Reserve.		
	e. Potential effects on surface water and groundwater due to construction (i.e. dewatering of trenches during installation of feeder watermain, control of erosion and sedimentation, construction and/or dredging at intake locations).	Higher potential to encounter surface and groundwater due to construction adjacent to the Cache Bay PSW as well as one unevaluated wetland.	Lower potential to encounter surface and groundwater.	Lower potential to encounter surface and groundwater.
	Natural Environment Evaluation Ranking			
Socio-Economic Environment	c. Potential nuisance impacts (e.g., disruption to access, air, dust, noise and vibration) from construction and operations.	Lower potential for nuisance impacts – all works within CPR right-of-way.	Potential nuisance impacts based on temporary property access disruptions.	Greater potential nuisance impacts based on temporary property access disruptions (more commercial areas along Water Feedermain route)
	d. Potential property requirements (temporary and permanent).	None anticipated – all works within CPR right-of-way.	Potential for temporary and/or permanent easements related to water crossings.	Potential for temporary and/or permanent easements related to water crossings.
	Socio-Economic Environment Evaluation Ranking			
Climate Change	a. Potential carbon footprint (e.g. energy usage, use of construction materials, construction methods and operations).	Construction limited to excavation for new Water Feedermain. Lower energy requirements related to shorter Water Feedermain route.	Construction limited to excavation for new Water Feedermain. Greater energy requirements related to longer Water Feedermain route and rock removal.	Construction limited to excavation for new Water Feedermain. Lower energy requirements related to shorter Water Feedermain route; however, greater energy requirements for rock removal.
	Climate Change Evaluation Ranking			
Cultural Environment	a. Potential effects on archaeological resources.	Potential impacts to archaeological resources related to Water Feedermain within undisturbed right-of-way of CPR Corridor.	Low to moderate potential for impacts to archaeological resources related to majority of works within disturbed right-of-way and water crossings along Water Feedermain route.	Low to moderate potential for impacts to archaeological resources related to majority of works within disturbed right-of-way and water crossings along Water Feedermain route.
	b. Potential for disruption of built heritage resources and cultural heritage landscapes.	No impacts anticipated to built heritage resources and cultural heritage landscapes.	Potential for indirect impacts (e.g. vibration) to built heritage resources and cultural heritage landscapes.	Potential for indirect impacts (e.g. vibration) to built heritage resources and cultural heritage landscapes.
	Cultural Environment Evaluation Ranking			

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Legend	Low Impact	Low to Moderate Impact	Moderate Impact	Moderate to High Impact	High Impact	Overall Most Preferred

Category & Criteria		Route 1: CPR Corridor	Route 2: Local Road Network	Route 3: TransCanada Highway/Local Road Network
Cost	a. Cost of construction (including property acquisition).	<ul style="list-style-type: none"> Lower cost relative to Route 2 based on shorter length of Water Feedermain and straightforward water crossings within CPR corridor. 	<ul style="list-style-type: none"> Higher cost based on longer length of Water Feedermain, potential rock removal and more complicated water crossings. 	<ul style="list-style-type: none"> Lower cost relative to Route 2 based on shorter length of Water Feedermain; however, higher cost related to the potential significant rock removal and more complicated water crossings.
	b. Cost of operation / maintenance.	<ul style="list-style-type: none"> Lowest anticipated operation/maintenance costs. CPR requires annual fees related to operation and maintenance. 	<ul style="list-style-type: none"> Moderate operation/maintenance costs related to more pumping (longest route). 	<ul style="list-style-type: none"> Moderate operation/maintenance costs.
	Cost Evaluation Ranking			
	Overall Evaluation Ranking			

For Internal Use Only – Overall Evaluation Scoring

Category	Scoring Weight (/100)	Route 1: CPR Corridor	Route 2: Local Road Network	Route 3: Route 3: TransCanada Highway/Local Road Network
Technical Environment	30	30	24	18
Natural Environment	20	16	20	20
Socio Economic Environment	10	10	8	6
Climate Change	10	10	8	8
Cultural Environment	10	10	8	8
Cost	20	20	12	16
Overall Score	Total: 100	96	80	76

Evaluation Ranking for each Category combines a) Scoring Weight and b) Pie Scoring Method where Low Impact = 5/5; Low to Moderate Impact = 4/5; Moderate Impact = 3/5; Moderate to High Impact = 2/5; High Impact = 1/5

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