

Niagara  Region

REGIONAL MUNICIPALITY OF NIAGARA
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS

V2.5 – Thorold South Servicing Short List Alternatives Evaluation

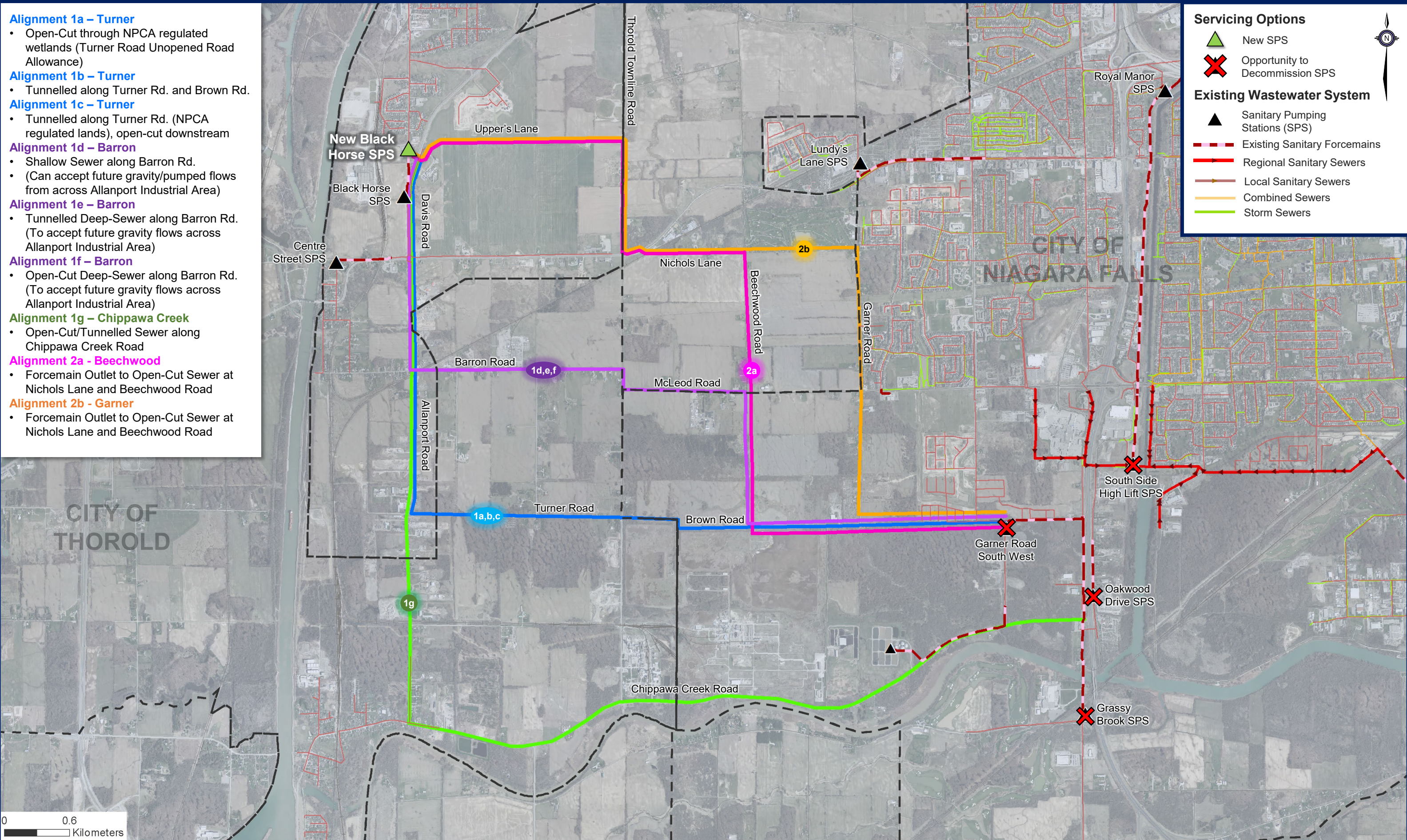
- Alignment 1a – Turner**
 - Open-Cut through NPCA regulated wetlands (Turner Road Unopened Road Allowance)
- Alignment 1b – Turner**
 - Tunnelled along Turner Rd. and Brown Rd.
- Alignment 1c – Turner**
 - Tunnelled along Turner Rd. (NPCA regulated lands), open-cut downstream
- Alignment 1d – Barron**
 - Shallow Sewer along Barron Rd.
 - (Can accept future gravity/pumped flows from across Allanport Industrial Area)
- Alignment 1e – Barron**
 - Tunnelled Deep-Sewer along Barron Rd. (To accept future gravity flows across Allanport Industrial Area)
- Alignment 1f – Barron**
 - Open-Cut Deep-Sewer along Barron Rd. (To accept future gravity flows across Allanport Industrial Area)
- Alignment 1g – Chippawa Creek**
 - Open-Cut/Tunnelled Sewer along Chippawa Creek Road
- Alignment 2a – Beechwood**
 - Forcemain Outlet to Open-Cut Sewer at Nichols Lane and Beechwood Road
- Alignment 2b – Garner**
 - Forcemain Outlet to Open-Cut Sewer at Nichols Lane and Beechwood Road

Servicing Options

- New SPS
- Opportunity to Decommission SPS

Existing Wastewater System




- Sanitary Pumping Stations (SPS)
- Existing Sanitary Forcemains
- Regional Sanitary Sewers
- Local Sanitary Sewers
- Combined Sewers
- Storm Sewers



South Niagara Falls Wastewater Solutions Class EA Thorold South Servicing Short List Alternative Alignments Evaluation

	Alignment I.a. Thorold South (Open-Cut – Turner Road) Screened Out	Alignment I.b. Thorold South (Tunnelling – Turner Road)	Alignment I.c. Thorold South (Tunnelling / Open-Cut – Turner Road)
Weighted Criteria	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to Allanport Road gravity sewer at Barron Road • Gravity sewer running along Allanport Road south to Turner Road unopened road allowance and then east along Turner Road outletting to Montrose Road Trunk Sewer north of Welland River crossing • Construction of forcemain / sewer by open-cut 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to Allanport Road gravity sewer at Barron Road • Gravity sewer running along Allanport Road south to Turner Road unopened road allowance and then east along Turner Road outletting to Montrose Road Trunk Sewer north of Welland River crossing • Construction of forcemain and sewer along Highway 58/Allanport by open-cut • Construction of sewer along Turner Road/Brown Road by tunnelling 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to Allanport Road gravity sewer at Barron Road • Gravity sewer running along Allanport Road south to Turner Road unopened road allowance and then east along Turner Road outletting to Montrose Road Trunk Sewer north of Welland River crossing • Construction of forcemain and sewer along Highway 58/Allanport by open-cut • Construction of sewer along Turner Road by tunnelling through NPCA regulated lands and open-cut along Brown Road
Environmental (25%)	<ul style="list-style-type: none"> - NPCA Regulated lands along Turner Road unopened road allowance (between Allanport Road and Thorold Townline Road) - Further environmental investigation (including fieldwork required for this alternative) - Future maintenance of sewer within NPCA regulated wetland requires additional coordination and approvals to satisfy environmental requirements - Further environmental studies required, open-cut significantly impacts Slough Forest Wetland Continuity – Likely significant recreation / reconfiguration and restoration required if open-cut were to be approved through mature swamp area. - Open-cut construction of this alternative was screened out as it is not preferred by NPCA 	<ul style="list-style-type: none"> - NPCA Regulated lands along Turner Road unopened road allowance (between Allanport Road and Thorold Townline Road) - Tunnelling/trenchless installation across entire length of Turner Road less impact to NPCA regulated wetlands and slough forest – shallow groundwater interaction to be evaluated - Further environmental investigation (including fieldwork required for this alternative) - Future maintenance of sewer within NPCA regulated wetland requires additional coordination and approvals to satisfy environmental requirements 	<ul style="list-style-type: none"> - NPCA Regulated lands along Turner Road unopened road allowance (between Allanport Road and Thorold Townline Road) - Tunnelling/trenchless installation through NPCA regulated lands only (with open-cut west of limit impact – shallow groundwater interaction to be evaluated) - Further environmental investigation (including fieldwork required for this alternative) - Future maintenance of sewer within NPCA regulated wetland requires additional coordination and approvals to satisfy environmental requirements
Social / Cultural (25%)	<ul style="list-style-type: none"> - Consideration for the open-cut construction of this alternative was removed following major environmental impact screening. 	<ul style="list-style-type: none"> - Low social, cultural and heritage impact - Direct servicing of developable land - Provides for enhanced servicing of Thorold South growth area along Allanport Road - Provides south trunk along Brown Road for future servicing of Southwest Niagara Falls growth (from north of Brown Road as well as lands immediately south of Brown Road) <ul style="list-style-type: none"> o Growth areas within Southwest Niagara Falls will be serviced through local / smaller trunks that outlet to the Brown Road sewer o Expectation that Southwest Niagara Falls will develop with or without Beechwood Trunk (as long as Brown Road trunk is available for outlet, upstream sewers will be constructed by City/development community) - Minimizes construction within road right-of-way (ROW) which will reduce traffic impact and business disruption - Traffic control will be required along Allanport Road 	<ul style="list-style-type: none"> - Low social, cultural and heritage impact - Direct servicing of developable land - Provides for enhanced servicing of Thorold South growth area along Allanport Road - Provides south trunk along Brown Road for future servicing of Southwest Niagara Falls growth (from north of Brown Road as well as lands immediately south of Brown Road) <ul style="list-style-type: none"> o Growth areas within Southwest Niagara Falls will be serviced through local / smaller trunks that outlet to the Brown Road sewer o Expectation that Southwest Niagara Falls will develop with or without Beechwood Trunk (as long as Brown Road trunk is available for outlet, upstream sewers will be constructed by City/development community) - Minimizes construction within road right-of-way (ROW) which will reduce traffic impact and business disruption - Traffic control will be required along Allanport Road
Legal / Jurisdictional (10%)	<ul style="list-style-type: none"> - Consideration for the open-cut construction of this alternative was removed following major environmental impact screening. 	<ul style="list-style-type: none"> - Required Easements / Property: Additional easement width from New Black Horse SPS location (at existing fire hall) to Highway 20 (existing 6.0 metre-wide watermain easement cannot accommodate watermain and new FM) - Crossings and Restrictions: 1 rail crossing along Allanport Road – where transition from forcemain to gravity sewer occurs - Additional Permitting: <ul style="list-style-type: none"> o Consideration for MTO owned sections of Highway 58 (north of Highway 20) and Highway 20 (between Highway 58 and Thorold Townline Road) o NPCA Permit (including extensive study in support of) for the open-cut sewer construction along Turner Road unopened road allowance 	<ul style="list-style-type: none"> - Required Easements / Property: Additional easement width from New Black Horse SPS location (at existing fire hall) to Highway 20 (existing 6.0 metre-wide watermain easement cannot accommodate watermain and new FM) - Crossings and Restrictions: 1 rail crossing along Allanport Road – where transition from forcemain to gravity sewer occurs - Additional Permitting: <ul style="list-style-type: none"> o Consideration for MTO owned sections of Highway 58 (north of Highway 20) and Highway 20 (between Highway 58 and Thorold Townline Road) o NPCA Permit (including extensive study in support of) for the open-cut sewer construction along Turner Road unopened road allowance
Technical (20%)	<ul style="list-style-type: none"> - Consideration for the open-cut construction of this alternative was removed following major environmental impact screening. 	<ul style="list-style-type: none"> - Total Length: 2.0 km of 400mm dia. Forcemain - Profile: ~6.8 km of 3.1m to 10.7m deep 600mm - 900mm dia. sewer - Provides greatest future servicing flexibility - Crossings: Significant watercourse crossing 200 metres south of Highway 20 drives depth of forcemain - Provides greatest future servicing flexibility - Constructability: <ul style="list-style-type: none"> - Continuous rising FM will require ~12m to 15m depth at Fire Station Black Horse SPS location, FM would require to be tunnelled or installed by open-cut with air release and drain chamber - Significant watercourse crossing, immediately west of Garner Road south leg intersection drives depth of sewer along Brown Road – section from Garner Road to Heartland Forest Road proposed shaft likely requires tunnelling - FM natural feature crossing at existing Black Horse SPS location and watercourse south of Highway 20 	<ul style="list-style-type: none"> - Total Length: 2.0 km of 400mm dia. Forcemain - Profile: ~6.8 km of 3.1m to 10.7m deep 600mm - 900mm dia. sewer - Crossings: Significant watercourse crossing 200 metres south of Highway 20 drives depth of forcemain - Provides greatest future servicing flexibility - Constructability: <ul style="list-style-type: none"> - Continuous rising FM will require ~12m to 15m depth at Fire Station Black Horse SPS location, FM would require to be tunnelled or installed by open-cut with air release and drain chamber - Significant watercourse crossing, immediately west of Garner Road south leg intersection drives depth of sewer along Brown Road – section from Garner Road to Heartland Forest Road proposed shaft likely requires tunnelling - FM natural feature crossing at existing Black Horse SPS location and watercourse south of Highway 20 - FM crosses under rail corridor and then outlets to gravity trunk sewer immediately south




South Niagara Falls Wastewater Solutions Class EA Thorold South Servicing Short List Alternative Alignments Evaluation

	Alignment I.a. Thorold South (Open-Cut – Turner Road) Screened Out	Alignment I.b. Thorold South (Tunnelling – Turner Road)	Alignment I.c. Thorold South (Tunnelling / Open-Cut – Turner Road)
Weighted Criteria	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to Allanport Road gravity sewer at Barron Road • Gravity sewer running along Allanport Road south to Turner Road unopened road allowance and then east along Turner Road outletting to Montrose Road Trunk Sewer north of Welland River crossing • Construction of forcemain / sewer by open-cut 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to Allanport Road gravity sewer at Barron Road • Gravity sewer running along Allanport Road south to Turner Road unopened road allowance and then east along Turner Road outletting to Montrose Road Trunk Sewer north of Welland River crossing • Construction of forcemain and sewer along Highway 58/Allanport by open-cut • Construction of sewer along Turner Road/Brown Road by tunnelling 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to Allanport Road gravity sewer at Barron Road • Gravity sewer running along Allanport Road south to Turner Road unopened road allowance and then east along Turner Road outletting to Montrose Road Trunk Sewer north of Welland River crossing • Construction of forcemain and sewer along Highway 58/Allanport by open-cut • Construction of sewer along Turner Road by tunnelling through NPCA regulated lands and open-cut along Brown Road
		<ul style="list-style-type: none"> - FM crosses under rail corridor and then outlets to gravity trunk sewer immediately south - Approx. 5 metres deep along Allanport Road (existing ground falls to the south and supports open-cut construction through the area) Depth will increase to pick up catchment north of rail (and south of watercourse crossing) - Going deeper at intersection of Turner Road and Thorold Townline Road will provide for pick-up of future Niagara Falls areas to the south of Brown Road - Ability to capture catchment from north (and south) of Brown Road in Niagara Falls will drive depth of sewer (~8 metres from Thorold-Townline east) 	<ul style="list-style-type: none"> - Approx. 5 metres deep along Allanport Road (existing ground falls to the south and supports open-cut construction through the area) Depth will increase to pick up catchment north of rail (and south of watercourse crossing) - Going deeper at intersection of Turner Road and Thorold Townline Road will provide for pick-up of future Niagara Falls areas to the south of Brown Road - Ability to capture catchment from north (and south) of Brown Road in Niagara Falls will drive depth of sewer (~8 metres from Thorold-Townline east)
Financial (20%)	<ul style="list-style-type: none"> - Consideration for the open-cut construction of this alternative was removed following major environmental impact screening. 	<p>To Commission:</p> <ul style="list-style-type: none"> o Additional property/easement required along Highway 58, north of Highway 20 o Shortest length, open-cut construction outside of travelled road o Tunnelled sewer requirements along Turner Road / Brown Road 	<p>To Commission:</p> <ul style="list-style-type: none"> o Additional property/easement required along Highway 58, north of Highway 20 o Shortest length, open-cut construction outside of travelled road o Tunnelled sewer requirements along Turner Road, and open-cut once outside of NPCA regulated lands along Turner Road unopened road allowance. Open-cut along Brown Road
Overall Rank	 Low	 Moderate	 Moderate
Differentiator	Open-cut through Turner Road Unopened Road Allowance will require extensive environmental study, protection and recreation. The open-cut option was determined to have low viability and has been screened out.	<p>Allanport Road alignment best services Thorold South growth area. Sewer along Turner and Brown Road provides trunk connections for future growth in Southwest Niagara Falls.</p> <p>Tunnelled section through Turner Road unopened road allowance will be expensive but can be combined with deeper tunnelled section along Turner Road and Brown Road to provide deep service connection for larger catchment area in South Thorold.</p>	<p>Allanport Road alignment best services Thorold South growth area. Sewer along Turner and Brown Road provides trunk connections for future growth in Southwest Niagara Falls.</p> <p>Tunnelled section through Turner Road unopened road allowance will be expensive but can provide deep service connection for larger catchment area in South Thorold. Open-cut will be utilized outside of the NPCA regulated lands to reduce construction costs.</p>

South Niagara Falls Wastewater Solutions Class EA Thorold South Servicing Short List Alternative Alignments Evaluation

Weighted Criteria	Alignment I.d. Thorold South (Barron Road Shallow Sewer)	Alignment I.e. Thorold South (Tunnelling – Barron Road Deep Sewer)	Alignment I.f. Thorold South (Open-Cut – Barron Road Deep Sewer)
Environmental (25%)	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to gravity sewer along Barron Road, east of rail corridor • Gravity sewer running along Barron Road/McLeod Road east to Beechwood Road and then south along Beechwood Road to Brown Road and then east along Brown Road outletting to Montrose Road Trunk Sewer • Construction of forcemain / sewer at open-cut depth (except at crossings) 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to gravity sewer along Barron Road, east of rail corridor • Gravity sewer running along Barron Road/McLeod Road east to Beechwood Road and then south along Beechwood Road to Brown Road and then east along Brown Road outletting to Montrose Road Trunk Sewer • Construction of forcemain by open-cut depth (except at crossings) • Construction of deep gravity sewer by tunnelling to provide future outlet for Thorold local sewer picking up south Allanport Road development 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to gravity sewer along Barron Road, east of rail corridor • Gravity sewer running along Barron Road/McLeod Road east to Beechwood Road and then south along Beechwood Road to Brown Road and then east along Brown Road outletting to Montrose Road Trunk Sewer • Construction of forcemain by open-cut depth (except at crossings) • Construction of deep gravity sewer by tunnelling to provide future outlet for Thorold local sewer picking up south Allanport Road development
Social / Cultural (25%)	<ul style="list-style-type: none"> - Low environmental impact - Alignment follows built right-of-way (ROWs) mitigating environmental impacts - Low social, cultural and heritage impact - Direct servicing of developable land - Shallow open-cut option objective to balance cost savings associated with open cut to as deep as practical with catchment / service area for Allanport South Area - Provides trunk along McLeod Road, Beechwood Road and Brown Road that will provide servicing benefit to South Thorold and Southwest Niagara Falls - Requires construction within Barron Road ROW <10 years after reconstruction project - increased traffic impact and business disruption. - Traffic control will be required along Allanport Road and Barron Road 	<ul style="list-style-type: none"> - Low environmental impact - Alignment follows built right-of-way (ROWs) mitigating environmental impacts - Low social, cultural and heritage impact - Direct servicing of developable land - Deeper tunnelled sub-option provides for enhanced servicing of Thorold South growth area along Allanport Road with connection at Barron Road for future local servicing from Allanport Road south - Provides trunk along McLeod Road, Beechwood Road and Brown Road that will provide servicing benefit to South Thorold and Southwest Niagara Falls - Requires construction within Barron Road ROW <10 years after reconstruction project - increased traffic impact and business disruption partially mitigated by tunnelled sewer. - Traffic control will be required along Allanport Road and Barron Road 	<ul style="list-style-type: none"> - Low environmental impact - Alignment follows built right-of-way (ROWs) mitigating environmental impacts - Low social, cultural and heritage impact - Direct servicing of developable land - Deeper open-cut sub-option provides for enhanced servicing of Thorold South growth area along Allanport Road with connection at Barron Road for future local servicing from Allanport Road south - Provides trunk along McLeod Road, Beechwood Road and Brown Road that will provide servicing benefit to South Thorold and Southwest Niagara Falls - Requires construction within Barron Road ROW <10 years after reconstruction project - increased traffic impact and business disruption with larger construction footprint required for deep open-cut construction. - Significant traffic control will be required along Allanport Road and Barron Road (with potential road closures)
Legal / Jurisdictional (10%)	<ul style="list-style-type: none"> - Required Easements / Property: Additional easement width from New Black Horse SPS location (at existing fire hall) to Highway 20 (existing 6.0 metre-wide watermain easement cannot accommodate watermain and new FM) - Crossings and Restrictions: 1 rail crossing along Allanport Road – where transition from forcemain to gravity sewer occurs - Additional Permitting: Consideration for MTO owned sections of Highway 58 (north of Highway 20) and Highway 20 (between Highway 58 and Thorold Townline Road) 	<ul style="list-style-type: none"> - Required Easements / Property: Additional easement width from New Black Horse SPS location (at existing fire hall) to Highway 20 (existing 6.0 metre-wide watermain easement cannot accommodate watermain and new FM) - Crossings and Restrictions: 1 rail crossing along Allanport Road – where transition from forcemain to gravity sewer occurs - Additional Permitting: Consideration for MTO owned sections of Highway 58 (north of Highway 20) and Highway 20 (between Highway 58 and Thorold Townline Road) 	<ul style="list-style-type: none"> - Required Easements / Property: Additional easement width from New Black Horse SPS location (at existing fire hall) to Highway 20 (existing 6.0 metre-wide watermain easement cannot accommodate watermain and new FM) - Crossings and Restrictions: 1 rail crossing along Allanport Road – where transition from forcemain to gravity sewer occurs - Additional Permitting: Consideration for MTO owned sections of Highway 58 (north of Highway 20) and Highway 20 (between Highway 58 and Thorold Townline Road)
Technical (20%)	<ul style="list-style-type: none"> - Total Length: 2.0 km of 400mm dia. Forcemain - Profile: ~6.9 km of 3.3m to 8.8m deep 600mm - 900mm dia. sewer by open-cut with trenchless crossings of rail corridor - Crossings: Significant watercourse crossing 200 metres south of Highway 20 drives depth of forcemain - Constructability: <ul style="list-style-type: none"> - Continuous rising FM will require ~12m to 15m depth at Fire Station Black Horse SPS location, FM would require to be tunnelled or installed by open-cut with air release and drain chamber - Significant watercourse crossing, immediately west of Garner Road south leg intersection drives depth of sewer along Brown Road – section from Garner Road to Heartland Forest Road proposed shaft likely requires tunnelling - FM natural feature crossing at existing Black Horse SPS location and watercourse south of Highway 20 - FM outlets to gravity trunk sewer at intersection of Allanport Road and Barron Road (to provide for future connection/outlet from Allanport Road local sewer) - Depth of gravity sewer along Barron Road, McLeod Road and Beechwood Road driven by future connection allowance at Allanport Road and Barron Road (for future local sewer running north along Allanport Road, and rail crossing along Barron Road) - Significant watercourse crossing, immediately west of Garner Road south leg intersection drives depth of sewer along Brown Road – section from Garner Road to Heartland Forest Road proposed shaft likely requires tunnelling - FM crossing at existing Black Horse SPS location and watercourse south of Highway 20 	<ul style="list-style-type: none"> - Total Length: 2.0 km of 400mm dia. Forcemain - Profile: ~6.9 km of 8.3m to 12m deep 600mm - 900mm dia. Sewer by tunnelling to mitigate construction disruption and restoration requirements - Crossings: Significant watercourse crossing 200 metres south of Highway 20 drives depth of forcemain - Constructability: <ul style="list-style-type: none"> - Continuous rising FM will require ~12m to 15m depth at Fire Station Black Horse SPS location, FM would require to be tunnelled or installed by open-cut with air release and drain chamber - Significant watercourse crossing, immediately west of Garner Road south leg intersection drives depth of sewer along Brown Road – section from Garner Road to Heartland Forest Road proposed shaft likely requires tunnelling - FM natural feature crossing at existing Black Horse SPS location and watercourse south of Highway 20 - FM outlets to gravity trunk sewer at intersection of Allanport Road and Barron Road (to provide for future connection/outlet from Allanport Road local sewer) - Depth of gravity sewer along Barron Road, McLeod Road and Beechwood Road driven by future connection allowance at Allanport Road and Barron Road (for future local sewer running north along Allanport Road, and rail crossing along Barron Road) - Deep sewer along Barron Road/McLeod Road, Beechwood Road and Brown Road includes: <ul style="list-style-type: none"> o Increased risk for tunnelling within mixed-face overburden/rock conditions or entirely through rock 	<ul style="list-style-type: none"> - Total Length: 2.0 km of 400mm dia. Forcemain - Profile: ~6.9 km of 8.3m to 12m deep 600mm - 900mm dia. Sewer by open-cut with trenchless crossings of rail corridor - Crossings: Significant watercourse crossing 200 metres south of Highway 20 drives depth of forcemain - Constructability: <ul style="list-style-type: none"> - Continuous rising FM will require ~12m to 15m depth at Fire Station Black Horse SPS location, FM would require to be tunnelled or installed by open-cut with air release and drain chamber - Significant watercourse crossing, immediately west of Garner Road south leg intersection drives depth of sewer along Brown Road – section from Garner Road to Heartland Forest Road proposed shaft likely requires tunnelling - FM natural feature crossing at existing Black Horse SPS location and watercourse south of Highway 20 - FM outlets to gravity trunk sewer at intersection of Allanport Road and Barron Road (to provide for future connection/outlet from Allanport Road local sewer) - Depth of gravity sewer along Barron Road, McLeod Road and Beechwood Road driven by future connection allowance at Allanport Road and Barron Road (for future local sewer running north along Allanport Road, and rail crossing along Barron Road) - Significant watercourse crossing, immediately west of Garner Road south leg intersection drives depth of sewer along Brown Road – section from Garner Road to Heartland Forest Road proposed shaft likely requires tunnelling - FM crossing at existing Black Horse SPS location and watercourse south of Highway 20 - Deep sewer along Barron Road/McLeod Road, Beechwood Road and Brown Road includes:




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Weighted Criteria	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to gravity sewer along Barron Road, east of rail corridor • Gravity sewer running along Barron Road/McLeod Road east to Beechwood Road and then south along Beechwood Road to Brown Road and then east along Brown Road outletting to Montrose Road Trunk Sewer • Construction of forcemain / sewer at open-cut depth (except at crossings) 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to gravity sewer along Barron Road, east of rail corridor • Gravity sewer running along Barron Road/McLeod Road east to Beechwood Road and then south along Beechwood Road to Brown Road and then east along Brown Road outletting to Montrose Road Trunk Sewer • Construction of forcemain by open-cut depth (except at crossings) • Construction of deep gravity sewer by tunnelling to provide future outlet for Thorold local sewer picking up south Allanport Road development <ul style="list-style-type: none"> ○ Increased risk for significant dewatering requirements from deep sewer/shafts near Welland River / bedrock fractures - Significant watercourse crossing, immediately west of Garner Road south leg intersection drives depth of sewer along Brown Road – section from Garner Road to Heartland Forest Road proposed shaft likely requires tunnelling - FM crossing at existing Black Horse SPS location and watercourse south of Highway 20 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to gravity sewer along Barron Road, east of rail corridor • Gravity sewer running along Barron Road/McLeod Road east to Beechwood Road and then south along Beechwood Road to Brown Road and then east along Brown Road outletting to Montrose Road Trunk Sewer • Construction of forcemain by open-cut depth (except at crossings) • Construction of deep gravity sewer by tunnelling to provide future outlet for Thorold local sewer picking up south Allanport Road development <ul style="list-style-type: none"> ○ Increased risk for significant dewatering requirements for deep sewer construction
Financial (20%)	<p>To Commission:</p> <ul style="list-style-type: none"> ○ Additional property/easement required along Highway 58, north of Highway 20 ○ Shallow sewer sub-option mitigates construction costs. 	<p>To Commission:</p> <ul style="list-style-type: none"> ○ Additional property/easement required along Highway 58, north of Highway 20 ○ Deep tunnelled gravity sewer significantly increases construction costs (to reduce disruption) 	<p>To Commission:</p> <ul style="list-style-type: none"> ○ Additional property/easement required along Highway 58, north of Highway 20 ○ Significant restoration requirements and potential for cost increase due to limitations on open-trench restrictions to limit dewatering of deep trenches (and resulting impact)
Overall Rank	 Very High	 High	 High
Differentiator	<p>Sewer along Allanport Road to Barron Road mitigates environmental issues and provides servicing benefit to both Thorold and Southwest Niagara Falls.</p> <p>Local sewer running north along Allanport Road will be required to pick up the south section of the Allanport growth area.</p> <p>Shallow sub-alternative objective is to balance level of enhanced servicing to south Allanport Road area with cost savings of shallow, open-cut construction</p>	<p>Sewer along Allanport Road to Barron Road mitigates environmental issues and provides servicing benefit to both Thorold and Southwest Niagara Falls.</p> <p>Local sewer running north along Allanport Road will be required to pick up the south section of the Allanport growth area.</p> <p>Service to entire Allanport South area will require deep tunnelled sewer and significantly increased construction costs</p>	<p>Sewer along Allanport Road to Barron Road mitigates environmental issues and provides servicing benefit to both Thorold and Southwest Niagara Falls.</p> <p>Local sewer running north along Allanport Road will be required to pick up the south section of the Allanport growth area.</p>

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Weighted Criteria	Alignment 1.g. Thorold South (Chippawa Creek Road)	Alignment 2.a. Southwest Niagara Falls (Beechwood Road)	Alignment 2.b. Southwest Niagara Falls (Garner Road)
Environmental (25%)	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to Allanport Road gravity sewer at Barron Road • Gravity sewer running along Allanport Road south to Chippawa Creek Road and then east along Chippawa Creek Road outletting to Montrose Road Trunk Sewer north of Welland River crossing 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS east Uppers Lane to Thorold Townline Road, south along Thorold Townline Road to Highway 20/Lundy's Lane, east along Highway 20/Lundy's Lane and Nichols Lane outletting to gravity sewer at Beechwood Road • Gravity sewer running along Beechwood Road south to Brown Road and then east along Brown Road outletting to Montrose Road Trunk Sewer 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS east along Uppers Lane to Thorold Townline Road, south along Thorold Townline Road to Highway 20/Lundy's Lane, east along Highway 20/Lundy's Lane and Nichols Lane outletting to gravity sewer at Garner Road • Gravity sewer running along Garner Road south to Brown Road and then east along Brown Road outletting to Montrose Road Trunk Sewer
Social / Cultural (25%)	<ul style="list-style-type: none"> - Alignment follows built right-of-way (ROWs) mitigating environmental impacts - Deep sewer along Chippawa Creek Road near Welland River <ul style="list-style-type: none"> o Increased potential for frac-out risk near Welland River o Increased risk for significant dewatering requirements from deep sewer/shafts near Welland River / bedrock fractures 	<ul style="list-style-type: none"> - Watercourse crossings along Beechwood Road and Brown Road - NPCA regulated lands / screening area near Nichols Lane is floodplain – construction impacts less significant (no additional fill to be placed within floodplain limits) 	<ul style="list-style-type: none"> - Majority of alignment will be constructed within Road ROW - NPCA regulated lands / screening area near Nichols Lane is floodplain – construction impacts less significant (no additional fill to be placed within floodplain limits)
Legal / Jurisdictional (10%)	<ul style="list-style-type: none"> - Required Easements / Property: Additional easement width from New Black Horse SPS location (at existing fire hall) to Highway 20 (existing 6.0 metre-wide watermain easement cannot accommodate watermain and new FM) - Crossings and Restrictions: 1 rail crossing along Allanport Road – where transition from forcemain to gravity sewer occurs - Additional Permitting: Potential for PTTW/EASR requirements for significant dewatering near Welland River if open-cut construction is considered 	<ul style="list-style-type: none"> - Required Easements / Property: 1 rail crossing along Nichols Lane – by forcemain - Crossings and Restrictions: Consideration for MTO owned section of Highway 20 (between Highway 58 and Thorold Townline Road) - Additional Permitting: Uppers Lane will require property coordination 	<ul style="list-style-type: none"> - Required Easements / Property: 1 rail crossing along Nichols Lane – by forcemain - Crossings and Restrictions: Consideration for MTO owned section of Highway 20 (between Highway 58 and Thorold Townline Road) - Additional Permitting: Uppers Lane will require property coordination
Technical (20%)	<ul style="list-style-type: none"> - Total Length: 2.0 km of 400mm dia. Forcemain - Profile: ~9.8 km of 2.5m to 9.6m deep 900mm dia. sewer - Crossings: Significant watercourse crossing 200 metres south of Highway 20 drives depth of forcemain - Constructability: <ul style="list-style-type: none"> - Provides greatest future servicing flexibility - Continuous rising FM will require ~12m to 15m depth at Fire Station Black Horse SPS location, FM would require to be tunnelled or installed by open-cut with air release and drain chamber - Significant watercourse crossing, immediately west of Garner Road south leg intersection drives depth of sewer along Brown Road – section from Garner Road to Heartland Forest Road proposed shaft likely requires tunnelling - FM natural feature crossing at existing Black Horse SPS location and watercourse south of Highway 20 - FM crosses under rail corridor and then outlets <ul style="list-style-type: none"> o Open-cut construction along Chippawa Creek Road anticipated to have increased risk of dewatering requirements o Winding Chippawa Creek Road will require shorter drive lengths and more manholes for any tunnelled sections - Deep sewer along Chippawa Creek Road near Welland River <ul style="list-style-type: none"> o Increased potential for frac-out risk near Welland River o Increased risk for tunnelling within mixed-face overburden/rock conditions or through rock near Welland River 	<ul style="list-style-type: none"> - Total Length: 4.2 km of 400mm dia. forcemain (based on outlet at Nichols Lane and Beechwood Road) - Profile: 4.9 km of 3.7m to 10.7m deep 600mm - 900mm dia. sewer - Crossings: Rail crossing along Nichols Lane drives depth of forcemain - Constructability: <ul style="list-style-type: none"> - Provides future servicing flexibility - Transition to gravity sewer at intersection of Nichols Lane and Beechwood Road provides for additional length of trunk sewer along Beechwood Road with depth that may better collect flows from City of Niagara Falls development to the east - Transition to gravity sewer along Beechwood Road allows for gravity sewer outlet to be located at general highpoint south of hydro corridor (and sewer that is <5m along Beechwood Road) - Continuous rising FM will require >5m depth at Fire Station Black Horse SPS location, FM would be ~10m depth at locations through the Uppers Lane unopened road allowance or installed by open-cut with 2 air release and 2 drain chambers <ul style="list-style-type: none"> o Significant watercourse crossing, immediately west of Garner Road south leg intersection drives depth of sewer along Brown Road – section from Garner Road to Heartland Forest Road proposed shaft likely requires tunnelling o Provides central servicing spine for future flexibility to service Southwest Niagara Falls growth areas 	<ul style="list-style-type: none"> - Total Length: 5.3 km of 400mm dia. Forcemain - Profile: 3.8 km of 3.5m to 10.7m deep 600mm - 900mm dia. sewer - Crossings: Rail crossing along Nichols Lane drives depth of forcemain - Constructability: <ul style="list-style-type: none"> - Provides future servicing flexibility - Transition to gravity sewer at intersection of Nichols Lane and Garner Road provides for gravity sewer along Garner Road that is in general 5 metres of depth and less - Continuous rising FM will require >5m depth at Fire Station Black Horse SPS location, FM would be ~10m depth at locations through the Uppers Lane unopened road allowance or installed by open-cut with 2 air release and 2 drain chambers <ul style="list-style-type: none"> o Significant watercourse crossing, immediately west of Garner Road south leg intersection drives depth of sewer along Brown Road – section from Garner Road to Heartland Forest Road proposed shaft likely requires tunnelling – Brown Road sewer depth will be increased to achieve catchment area / conveyance of flows west of Garner Road - Existing/recently constructed City of Niagara Falls servicing along Garner Road indicates that the Garner Road corridor is already congested with existing underground servicing and utilities

South Niagara Falls Wastewater Solutions Class EA Thorold South Servicing Short List Alternative Alignments Evaluation

Weighted Criteria	Alignment 1.g. Thorold South (Chippawa Creek Road)	Alignment 2.a. Southwest Niagara Falls (Beechwood Road)	Alignment 2.b. Southwest Niagara Falls (Garner Road)
	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS south along Highway 58/Allanport Road outletting to Allanport Road gravity sewer at Barron Road • Gravity sewer running along Allanport Road south to Chippawa Creek Road and then east along Chippawa Creek Road outletting to Montrose Road Trunk Sewer north of Welland River crossing 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS east Uppers Lane to Thorold Townline Road, south along Thorold Townline Road to Highway 20/Lundy's Lane, east along Highway 20/Lundy's Lane and Nichols Lane outletting to gravity sewer at Beechwood Road • Gravity sewer running along Beechwood Road south to Brown Road and then east along Brown Road outletting to Montrose Road Trunk Sewer 	<ul style="list-style-type: none"> • Forcemain from New Black Horse SPS east along Uppers Lane to Thorold Townline Road, south along Thorold Townline Road to Highway 20/Lundy's Lane, east along Highway 20/Lundy's Lane and Nichols Lane outletting to gravity sewer at Garner Road • Gravity sewer running along Garner Road south to Brown Road and then east along Brown Road outletting to Montrose Road Trunk Sewer
	<ul style="list-style-type: none"> ○ Increased risk for significant dewatering requirements from deep sewer/shafts near Welland River / bedrock fractures 		
Financial (20%)	<p>To Commission:</p> <ul style="list-style-type: none"> ○ Additional property/easement required along Highway 58, north of Highway 20 ○ Nearly 10 km of gravity sewer with potential for extensive dewatering / trenchless construction requirements 	<p>To Commission:</p> <ul style="list-style-type: none"> ○ Most cost-efficient Southwest Niagara Falls focused alternative (potentially more cost-efficient with extension of forcemain south along Beechwood Road to high-point) ○ Will still require 4.0 km of sewer along Brown Road, or equivalent pumping/forcemain solution to service South Thorold 	<p>To Commission:</p> <ul style="list-style-type: none"> ○ Most expensive Southwest Niagara Falls construction alternative (primarily due to congested Garner Road ROW ex. underground services and recent road reconstruction projects) ○ Will still require 4.0 km of sewer along Brown Road, or equivalent pumping/forcemain solution to service South Thorold
Overall Rank	 Low	 High	 High
Differentiator	<p>Sewer along Chippawa Creek Road provides servicing benefit to Allanport Road development area but does not provide servicing benefit to Southwest Niagara Falls.</p> <p>The Chippawa Creek Road gravity sewer is longest and most expensive sewer option.</p>	<p>Beechwood Road alignment best provides central trunk gravity sewer for future growth areas in Southwest Niagara Falls.</p> <p>Deep trunk sewer along Brown Road could support future servicing of south limits of Thorold South.</p>	<p>Garner Road alignment will be located further from west growth in Southwest Niagara Falls (and there are already existing City trunk sewer connections for east and immediate area development).</p> <p>Shortest length of trunk sewer on Brown Road which provides less flexibility for direct servicing of future growth areas in Niagara Falls and potential south limits of Thorold South.</p>