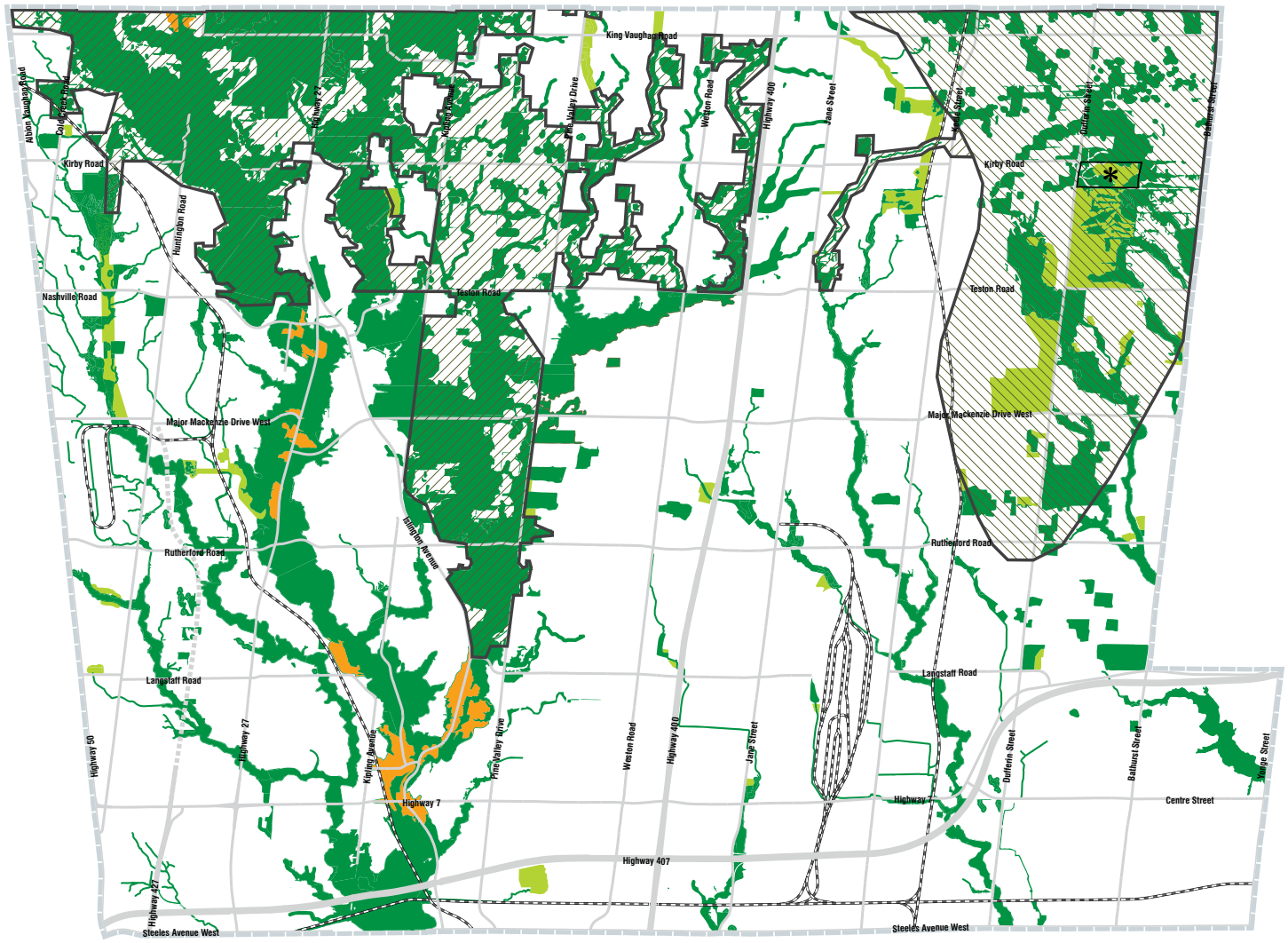
# APPENDIX A
# Official Plan – Schedules

VAUGHAN

SCHEDULE 2

# Natural Heritage Network



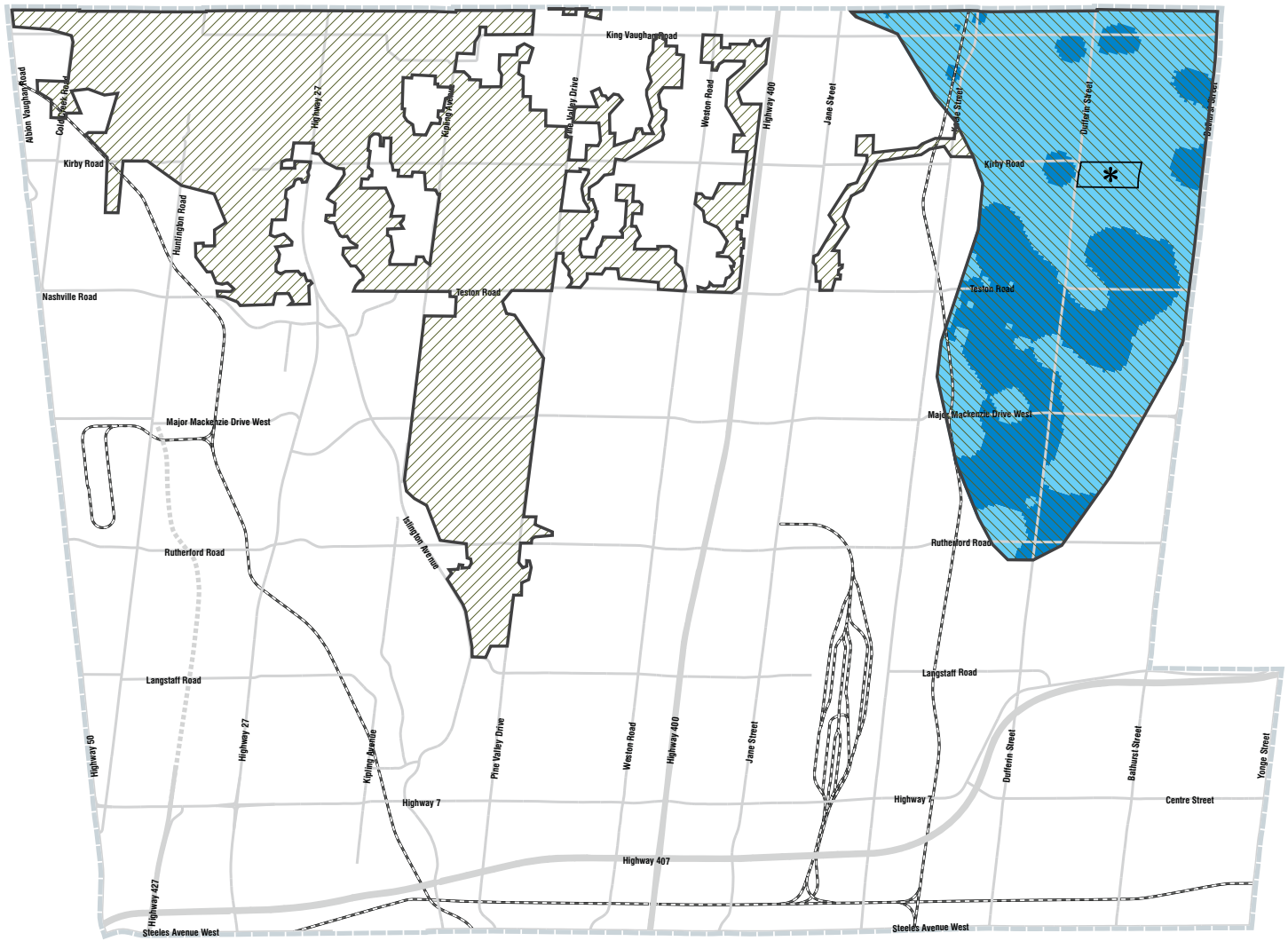

- Core Features
- Enhancement Areas
- Built-Up Valley Lands
- Greenbelt Plan Area
- Oak Ridges Moraine Conservation Plan Area
- * Minister's Decision on ORMCP Designation Deferred
- Municipal Boundary

September 2010

VAUGHAN

SCHEDULE 6

# Aquifer Vulnerability




Low Vulnerability Aquifer

High Vulnerability Aquifer

Greenbelt Plan Area

Oak Ridges Moraine Conservation Plan Area

Minister's Decision on ORMCP Designation Deferred

Municipal Boundary

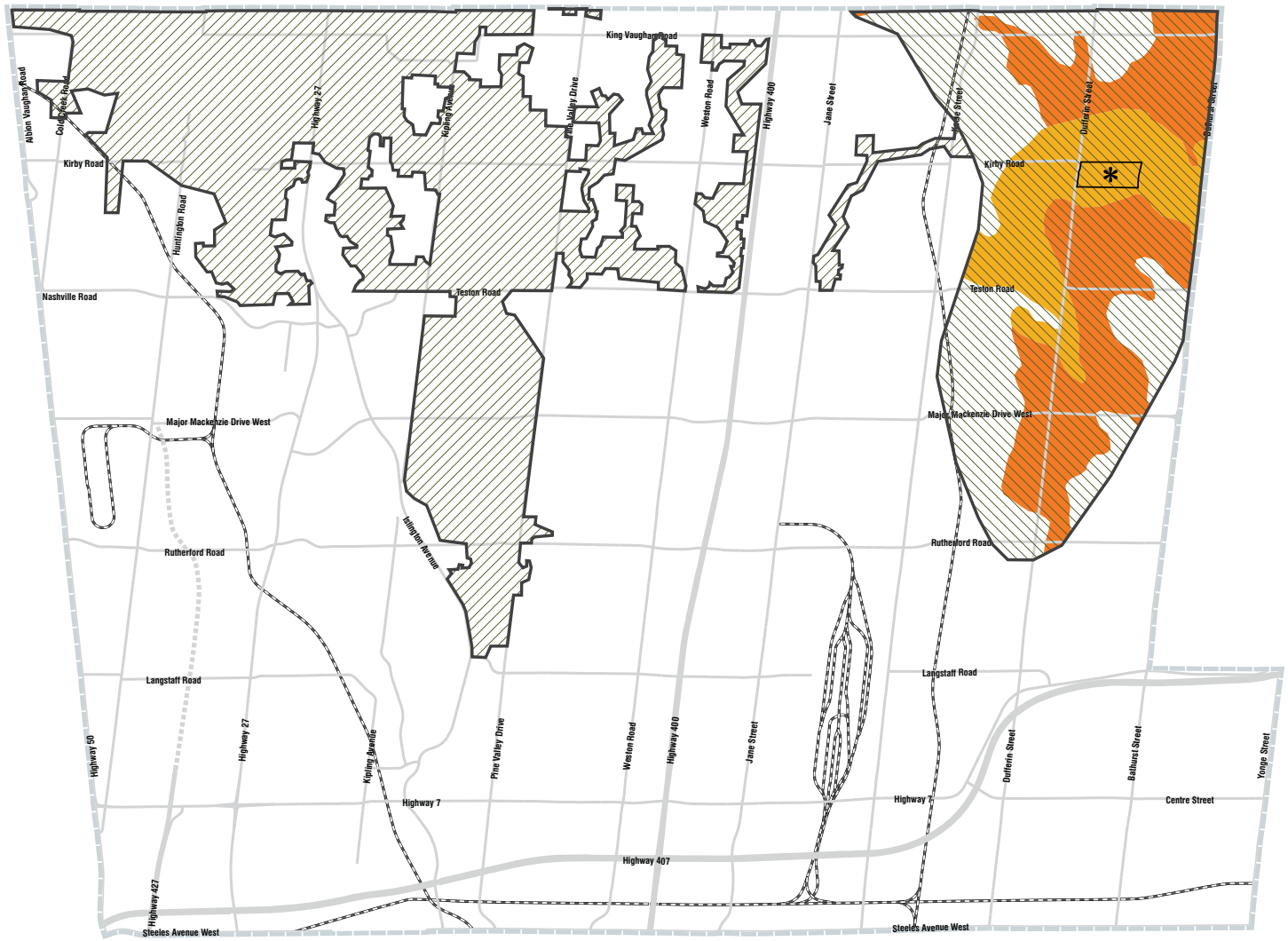
0 1,000 2,000 3,000 4,000 5,000 Meters

September 2010

VAUGHAN

SCHEDULE 7

# Landform Conservation




- Category 1
- Category 2
- Greenbelt Plan Area
- Oak Ridges Moraine Conservation Plan Area
- * Minister's Decision on ORMCP Designation Deferred
- Municipal Boundary

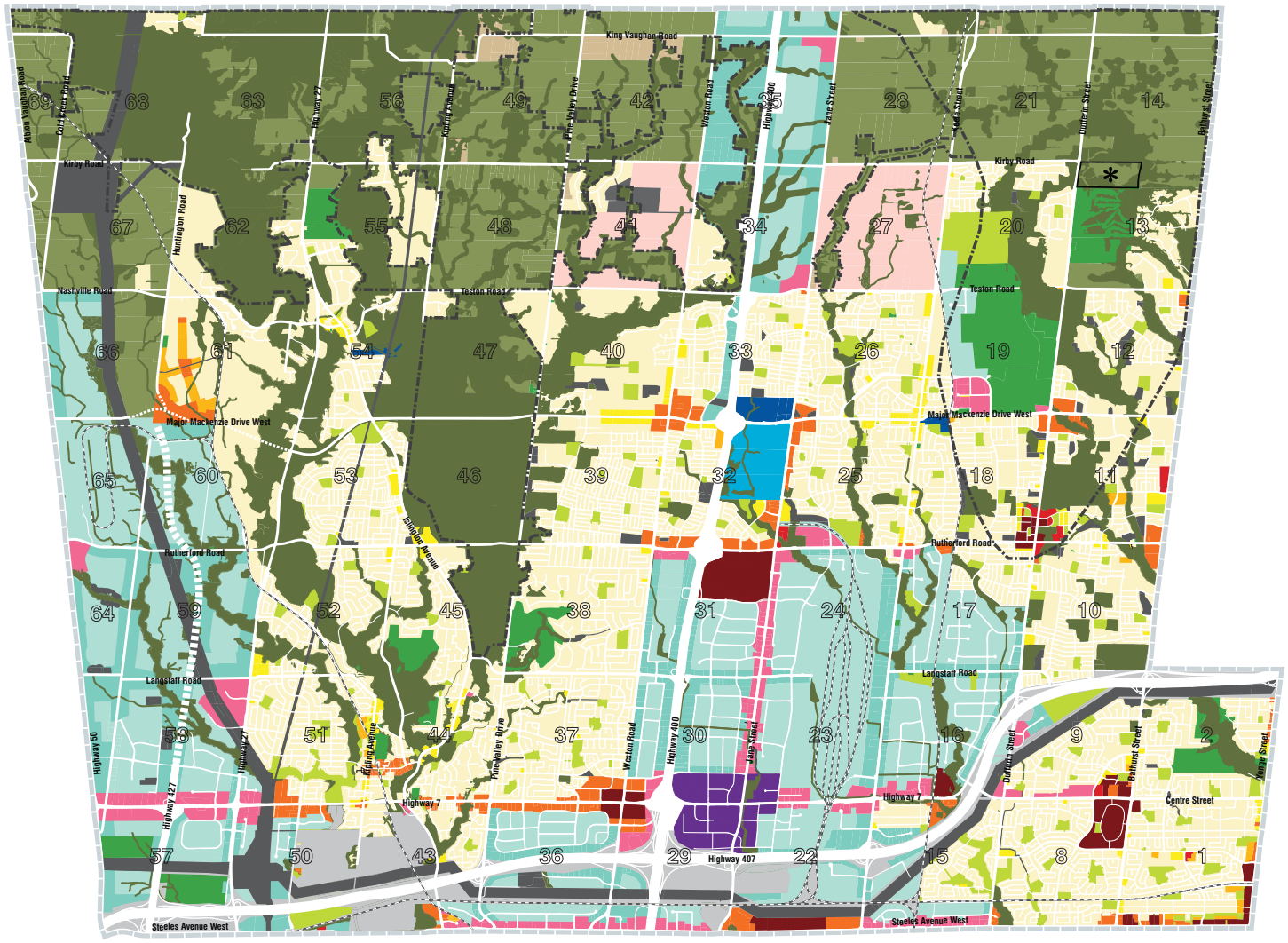
0 1,000 2,000 3,000 4,000 5,000 Meters

September 2010

VAUGHAN

SCHEDULE 13

# Land Use




- Natural Areas
- Parks
- Private Open Spaces
- Agricultural
- Rural Residential
- Low-Rise Residential
- Low-Rise Mixed-Use
- Mid-Rise Residential
- Mid-Rise Mixed-Use
- High-Rise Residential
- High-Rise Mixed-Use
- Commercial Mixed-Use
- Downtown Mixed-Use
- General Employment
- Prestige Employment
- Major Institutional
- New Community Areas
- Theme Park and Entertainment
- Parkway Belt West Lands
- Infrastructure and Utilities
- Roads
- Railway
- Greenbelt Plan Area and Oak Ridges Moraine Conservation Plan Area
- * Minister's Decision on ORMCP Designation Deferred
- Municipal Boundary

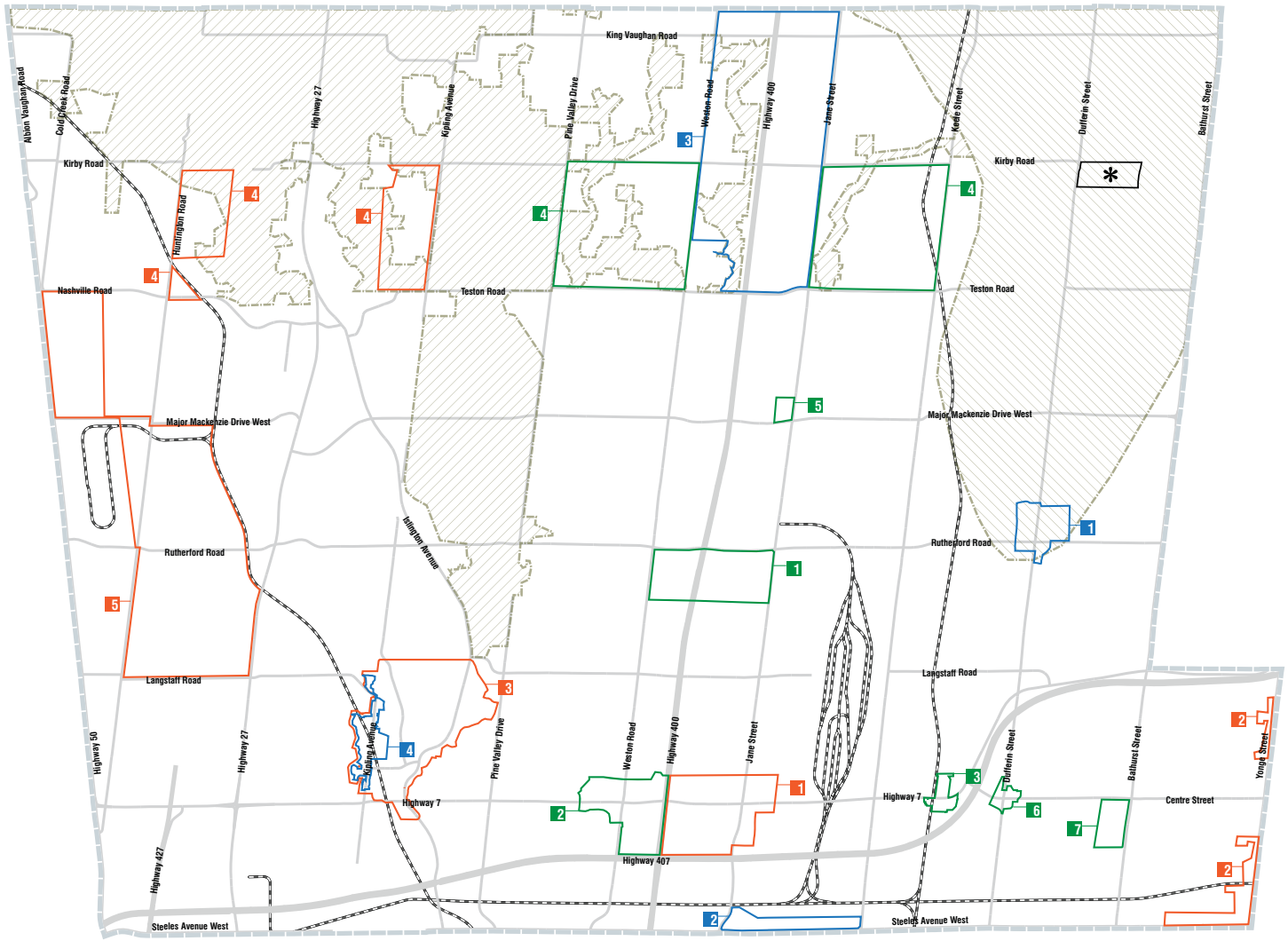
0 1,000 2,000 3,000 4,000 5,000 Meters

September 2010

VAUGHAN

SCHEDULE 14-A

# Areas Subject to Secondary Plans




Secondary Plan Areas – Chapter 11

1. Carrville Centre Secondary Plan – 11.2
2. Steeles West Secondary Plan – 11.3
3. Highway 400 North Employment Lands – 11.4
4. Kipling Avenue – 11.5

Secondary Plan Areas to be Approved

1. Vaughan Metropolitan Centre
2. Yonge Street Corridor
3. Woodbridge Focused Area
4. Kleinburg-Nashville Focused Area
5. West Vaughan Employment Area

Required Secondary Plan Areas

1. Vaughan Mills Centre
2. Weston Road and Highway 7
3. Concord Centre
4. New Community Areas (Blocks 41 & 27)
5. Jane Street and Major Mackenzie Drive
6. Dufferin Street and Centre Street
7. Promenade Mall

* Minister's Decision on ORMCP Designation Deferred

Municipal Boundary

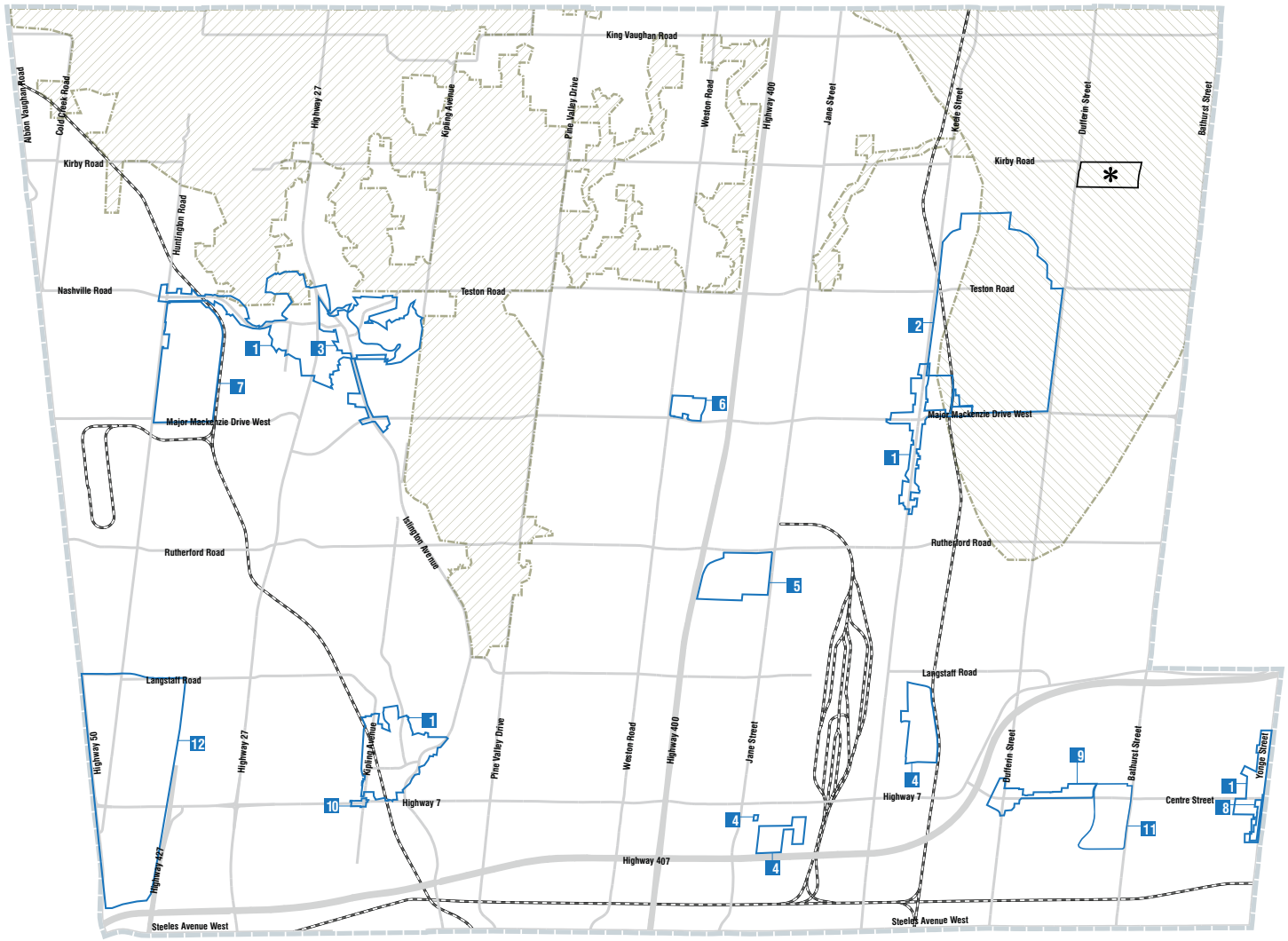
0 1,000 2,000 3,000 4,000 5,000 Meters

September 2010

VAUGHAN

SCHEDULE 14-B

# Areas Subject to Area Specific Plans




Area Specific Areas – Chapter 12

1. Heritage Conservation Districts – 12.2
2. Keele Valley Landfill Area – 12.3
3. Kleinburg Core – 12.4
4. Adult Entertainment Uses – 12.5
5. Vaughan Mills Mall – 12.6
6. N-E Quadrant of Major Mackenzie Dr. and Weston Rd.– 12.7
7. Block 61 West: "Nashville Heights" – 12.8
8. Yonge Street Corridor in Thornhill – 12.9
9. Centre Street Corridor – 12.10
10. Kipling Avenue and Highway 7 – 12.11
11. Bathurst and Centre Street – 12.12
12. Huntington Business Park – 12.13

* Minister's Decision on ORMCP Designation Deferred

Municipal Boundary

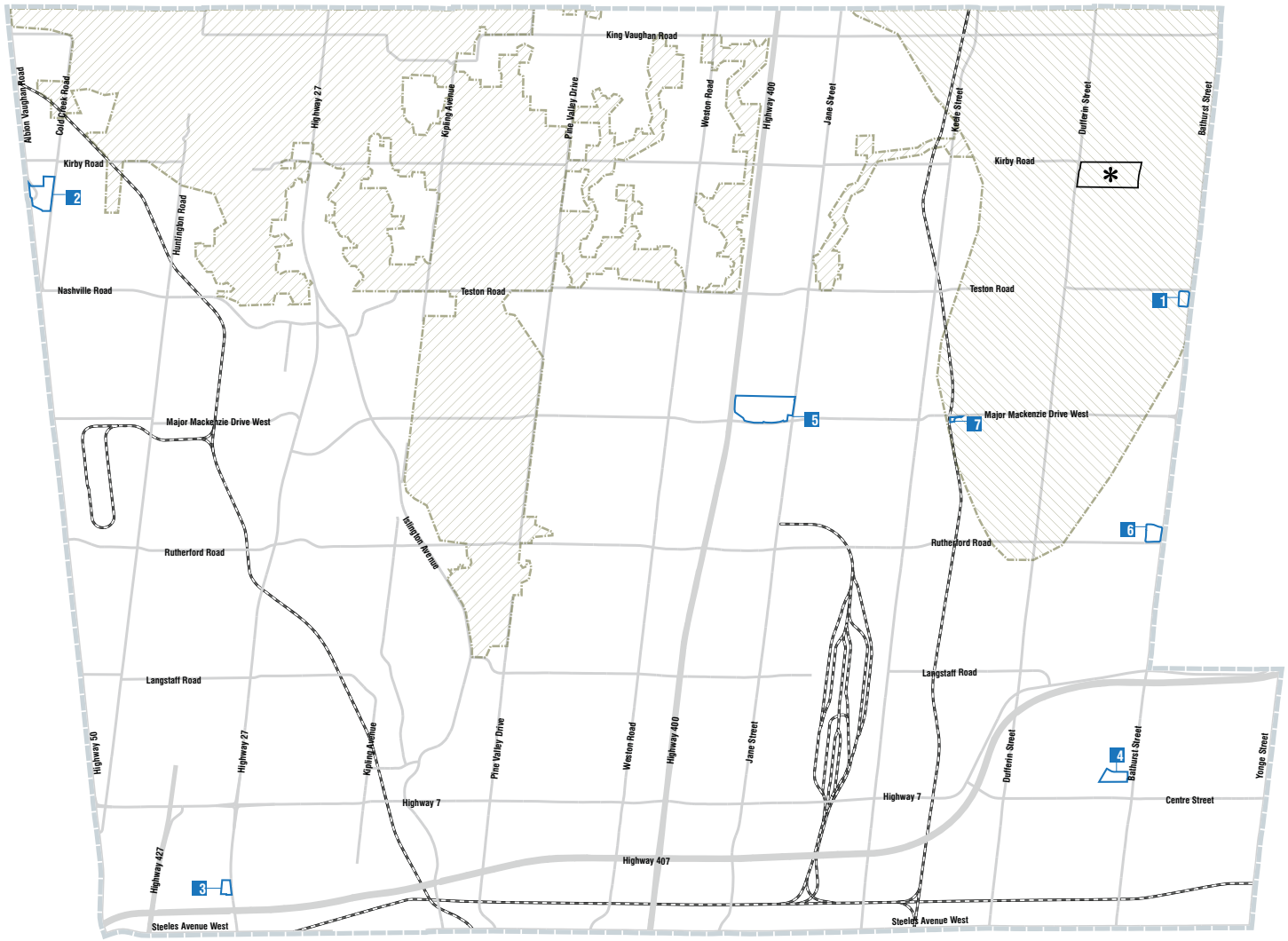
0 1,000 2,000 3,000 4,000 5,000 Meters

September 2010

VAUGHAN

SCHEDULE 14-C

# Areas Subject to Site Specific Plans




Site Specific Areas – Chapter 13

1 S-W Corner of Bathurst St. and Teston Rd. – 13.2
2 1125 Highway 50 – 13.3
4 7242 Highway 27 – 13.4
3 Thornhill Liberty Lands – 13.5
5 Vaughan Healthcare Campus – 13.6
6 N-W Corner of Rutherford Road and Bathurst Street – 13.7
7 2057 Major Mackenzie Drive – 13.8

* Minister's Decision on ORMCP Designation Deferred

Municipal Boundary

0 1,000 2,000 3,000 4,000 5,000 Meters

September 2010

# APPENDIX B
# Stormwater Management Evaluation

## Yonge-Steeles Secondary Plan Area

| Alternative | Alternative 1: Do Nothing | | | | Alternative 2: At Source/Lot Level Controls | | | | Alternative 3: End of Pipe | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Description** | No implementation of Stormwater Management | | | | Oppourtunity to provide quantity control, quality control, water balance and erosion mitigation through: Rooftop storage, Parking lot storage, Green Roofs, disconnection of roof leaders, Rain Barrels, Infiltration Trenches, Swales, Rain Gardens, pervious pipe systems, vegetated filter strips, permeable pavement, oil/grit separator units | | | | Oppourtunity to provide quantity control, quality control, water balance and erosion mitigation through: Dry/Wet Ponds | | | |
| **Drainage Area** | North Study Area | Overall Rank | South Study Area | Overall Rank | North Study Area | Overall Rank | South Study Area | Overall Rank | North Study Area | Overall Rank | South Study Area | Overall Rank |
| **Criteria** | Quantity - No Controls | | Quantity - No Controls | | Quantity - Post-Development peak flows to be controlled to existing peak flows | | Quantity - Post-Development peak flows to be controlled to existing peak flows | | Quantity - Post-Development peak flows to be controlled to existing peak flows | | Quantity - Post-Development peak flows to be controlled to existing peak flows | |
| | Quality - No Controls | | Quality - No Controls | | Quality - Enchanced Level I - 80% TSS Removal | | Quality - Enchanced Level I - 80% TSS Removal | | Quality - Enchanced Level I - 80% TSS Removal | | Quality - Enchanced Level I - 80% TSS Removal | |
| **Technical** | | | | | | | | | | | | |
| Oppourtunity to provide stormwater quantity control and flood protection | Increase in drainage towards existing storm sewers on Yonge Street may exceed existing infrastructure capacity. | ○ | Reduction in overall imperviousness results in reduced peak flows. May potentially help reduce existing flooding in the Brooke Street Trunk Sewer | ◑ | Quantity control of 138 m3/ha is required for the north study area. Oppourtunity to reduce peak flows and provide quantity/flood controls through rooftop storage, super pipe storage, rain barrels, rain gardens and cisterns. | ● | Quantity control is not required for the south study area as the proposed conditions generate less runoff than the existing condtions however there is the oppourtunity to improve the existing condition through rooftop storage, super pipe storage, rain barrels, rain gardens and cisterns. Would potentially help alleviate flooding along the Brook Street Trunk Sewer as well as minor surcharging located on Steeles Ave in addition to the overall decrease in imperviousnesses under post-development conditions. | ● | Quantity control of 138 m3/ha is required. A wet SWM facility would be able to provide quantity/quality control. | ● | Quantity control is not required for the south study area as the proposed conditions generate less runoff than the existing condtions. A SWM facility has been proposed through the Gallanough Park EA which is intended to alleviate flooding along the Brook Street Trunk Sewer | ● |
| Oppourtunity to provide stormwater quality control | Does not provide stormwater quality control. Water quality downstream may decrease as a result an increase in impervious surfaces for the proposed redevelopement | | Does not provide stormwater quality control however water quality downstream may improve as a result in a decrease in impervious surfaces for the proposed redevelopement | | Oppourtunity to provide quality control through green roofs, swales or vegetated filter strips. It would be possible to incorporate passive mechanical systems such as OGS units and other filtration systems to provide quality control | | Oppourtunity to provide quality control through green roofs, swales or vegetated filter strips. It would be possible to incorporate passive mechanical systems such as OGS units and other filtration systems to provide quality control. | | A wet SWM facility would be able to provide Enhanced Level I protection | | Wet SWM facilities would be able to provide Enhanced Level I protection | |
| Oppourtunity to improve water balance | Does not improve current water balance as there is an increase in impervious areas and will generate greater run-off | | Improves current water balance as there is an increase in pervious areas | | Oppourtunity to improve water balance through, rain gardens/barrels, infiltration trenches, vegetated and buffer strips, pervious pipe systems and permeable pavement. First 5 mm of storm to be retained on-site to reduce runoff | | Oppourtunity to improve water balance through, rain gardens/barrels, infiltration trenches, vegetated and buffer strips, pervious pipe systems and permeable pavement. First 5 mm of storm to be retained on-site to reduce runoff. | | Challenge to improve water balance at a single end of pipe location. Oppourtunities to improve water balance are typically provided at the lot level throughout the development | | Challenge to improve water balance at a single end of pipe location. Oppourtunities to improve water balance are typically provided at the lot level throughout the development | |
| Oppourtunity to mitigate against erosion to watercourses | May create downstream erosion if point discharges are increased for the proposed development | | Unlikely to increase downstream erosion as peak flows generated are reduced | | By reducing peak flows and infiltrating more stormwater, downstream erosion can be avoidec | | By reducing peak flows and infiltrating more stormwater, downstream erosion can be avoidec | | Centralised end of pipe facilities have the potential to mitigate downstream erosion | | Centralised end of pipe facilities have the potential to mitigate downstream erosion | |
| **Natural Environmental** | | | | | | | | | | | | |
| Potential impacts to aquatic habitat | The Yonge-Steeles Corridor is within the Don Watershed where Redside Dace have previously been identified If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | | The Yonge-Steeles Corridor is within the Don Watershed where Redside Dace have previously been identified If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | | Redside Dace have previously been identified within the Don Watershed. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. Addtionally, the cooling effects of stormwater through lot level controls is better suited for Redside Dace | | Redside Dace have previously been identified within the Don Watershed. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. Addtionally, the cooling effects of stormwater through lot level controls is better suited for Redside Dace | | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. Redside Dace have previously been identified within the Golden Horseshoe Region of Ontario which includes the City of Vaughan. Discharge from SWM facilities will be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. Redside Dace have previously been identified within the Golden Horseshoe Region of Ontario which includes the City of Vaughan. Discharge from SWM facilities will be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | |
| Potential impacts to terrestrial habitats | Extents of development are located outside the natural features (including terrestrial habitat) corridor | ○ | Extents of development are located outside the natural features (including terrestrial habitat) corridor. There is an increase in green space under post development conditions | ● | Extents of development are located outside the natural features (including terrestrial habitat) therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | ● | Extents of development are located outside the natural features (including terrestrial habitat) therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | ● | Extents of development are located outside the natural features (including terrestrial habitat) therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | ● | Extents of development are located outside the natural features (including terrestrial habitat) therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | ● |
| Potential Impacts to natural features | Natural features are located outside the development area | | Natural features are located outside the development area | | All SWM controls to be located at lot level therefore will not impact nature features | | All SWM controls to be located at lot level therefore will not impact nature features | | Extents of development have been limited by the Natural Heritage corridor as defined in the City's official plan therefore there are no anticipated negative impacts to natural features. | | Extents of development have been limited by the Natural Heritage corridor as defined in the City's official plan therefore there are no anticipated negative impacts to natural features. | |
| Potential impacts to species of concern | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | |
| **Social/Cultural Environment** | | | | | | | | | | | | |
| Potential impacts on public health and safety | May impact public safety if the existing stormsewers along Yonge Street cannot accommodate increased peak flows which may result in flooding | ○ | No anticipated impacts to public health and safety provided drainage infrastructure is sized accordingly | ◑ | Improves public safety by reducing flooding risk by providing lot level quantity control measures | ● | Improves public safety by reducing flooding risk by providing lot level quantity control measures | ● | Reducing peak flows, improving water quality and reducing downstream erosion through a centralised end of pipe facility will improve public health and safety | ● | Reducing peak flows, improving water quality and reducing downtream erosion through a centralised end of pipe facility will improve public health and safety particularly in areas where there has been existing flooding such as the Brook Street Trunk Sewer | ◑ |
| Potential Impacts to private properties | Potential flood impacts to private properties if stormsewers along Yonge Street cannot accommodate increased peak flows | | There is existing minor surcharging in stormsewers along Hilda Avenue from Steeles Avenue to Crestwood Road however the City nor the Region have previously reported issues with these storm sewers. No anticipated impacts to private properties | | Lot level controls to be implemented on High-Rise and Mid-Rise mixed use areas. Controls have the potential to reduce peak flows and potential flooding, improve water quality and reduce downstream erosion | | Lot level controls to be implemented on High-Rise and Mid-Rise mixed use areas. Controls have the potential to reduce peak flows and potential flooding, improve water quality and reduce downstream erosion | | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands. The Gallanough Park Pond could be part of the overall solution. | |
| Potential Impacts to public property | Potential flood impacts to public properties if stormsewers along Yonge Street cannot accommodate increased peak flows | | There is existing minor surcharging in stormsewers along Hilda Avenue from Steeles Avenue to Crestwood Road however the City nor the Region have previously reported issues with these storm sewers. No anticipated impacts to public properties | | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure. Controls could potentially be located in park spaces which may enhance their aesthetic value | | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure. Controls could potentially be located in park spaces which may enhance their aesthetic value | | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands. The Gallanough Park Pond could be part of the overall solution | |
| Potential Impacts to built and cultural heritage landscape | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | |
| Potential Impacts to archaeological resources | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | |
| **Economic Environment** | | | | | | | | | | | | |
| Capital costs | No capital costs as there is no SWM to be implemented | ● | No capital costs as there is no SWM to be implemented | ● | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $120,000 and only address quality control. Size and costs of OGS units can be reduced by incoporating other quality measures to provide a treatment train approach | ● | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $600,000 and only addresses quality control. | ◑ | Significant capital costs associated with construction of end of pipe SWM facilities, the estimated pond block size for a quantity/quality facility based on MOE design criteria would be 0.1 ha. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for quality facility is $80,000 | ● | Significant capital costs associated with construction of end of pipe SWM facilities. It it anticipated that 2 quality facilities are required to service the area. The estimated pond block sizes for the facilities based on MOE design criteria would be are 0.5 ha and 0.2 ha. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for the facilities are $400,000 and $160,000 respectively | ◑ |
| Property acquisitions, permit costs | No property acquistions or permits anticipated | | No property acquistions or permits anticipated | | Lot level controls will not require additional property | | Lot level controls will not require additional property | | No property acquistions anticipated. Permits will be required for the construction activities | | No property acquistions anticipated. Permits will be required for the construction activities | |
| Operation and Maintenance costs | No operation and maintenace anticipated | | No operation and maintenace anticipated | | Operation and Maintenance will be required to maintain the efficiency of quanitity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approximately total annual sediment loadings, it would cost approximately $12, 000/year to maintain the OGS units twice per year | | Operation and Maintenance will be required to maintain the efficiency of quanitity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approximately total annual sediment loadings, it would cost approximately $55, 000/year to maintain the OGS units twice per year | | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with the facility for this area is $20,000/year | | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with the facilities for this area are $98,000/year and $23,000/year | |
| Risk management | Possible risks as the cost of doing nothing may result in flood damage and downstream erosion | | No known risks | | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented particularly as it relates to the Brook Street Trunk Sewer | | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented particularly as it relates to the Brook Street Trunk Sewer | |
| **Adaptation/Climate Change** | | | | | | | | | | | | |
| **Preferred Alternative** | ○ | | ◑ | | ● | | ● | | ◑ | | ◑ | |

| | |
|---|---|
| **Most Preferred** | ● |
| **Moderate** | ◑ |
| **Least Preferred** | ○ |

## Woodbridge Core Secondary Plan Area

| **Alternative** | **Alternative 1: Do Nothing** | | | | **Alternative 2: At Source/Lot Level Controls** | | | |
|---|---|---|---|---|---|---|---|---|
| **Description** | **No implementation of Stormwater Management** | | | | **Oppourtunity to provide quantity control, quality control, water balance and erosion mitigation through: Rooftop storage, surface ponding, Green Roofs, superpipe storage, cisterns, roof leader disconnection, Infiltration Trenches, Swales, Rain Gardens, vegetated filter strips, permeable pavement, oil/grit separator units** | | | |
| **Drainage Area** | **Islington Avenue** | **Overall Rank** | **Woodbridge Avenue** | **Overall Rank** | **Islington Avenue** | **Overall Rank** | **Woodbridge Avenue** | **Overall Rank** |
| **Criteria** | **Quantity - No Controls. It is noted that the TRCA's criteria states that there are no quantity control requirements for this protion of the Humber Watershed**<br>**Quality - No Controls**<br>**Water Balance/Erosion - No Controls** | | **Quantity - No Controls. It is noted that the TRCA's criteria states that there are no quantity control requirements for this protion of the Humber Watershed**<br>**Quality - No Controls**<br>**Water Balance/Erosion - No controls** | | **Quantity - Post-Development flows to be controlled to 5 year existing flows. It is noted that the TRCA's criteria states that there are no quantity control requirements for this protion of the Humber Watershed however due to existing flooding in the area, a more stringent criteria has been applied**<br>**Quality - Enchanced Level I - 80% TSS Removal**<br>**Water Balance/Erosion - On-site retention of 5 mm** | | **Quantity - Post-Development flows to be controlled to 5 year existing flows. It is noted that the TRCA's criteria states that there are no quantity control requirements for this protion of the Humber Watershed however due to existing flooding in the area, a more stringent criteria has been applied**<br>**Quality - Enchanced Level I - 80% TSS Removal**<br>**Water Balance/Erosion - On-site retention of 5 mm** | |
| **Technical** | | | | | | | | |
| Oppourtunity to provide stormwater quantity control and flood protection | Does not provide stormwater quantity control. The increase in imperviousness will generate higher peak flows | ○ | Does not provide stormwater quantity control. The increase in imperviousness will generate higher peak flows | ○ | Quantity control of 312 m3/ha is required for the redevelopment of Islington Avenue. Oppourtunity to reduce peak flows and provide quantity flood controls through super pipe storage and underground storage systems. This area is being redeveloped to mid-rise residential therefore the applicability of certain quantity control measures will need to be confirmed upon approved site plan | ● | Quantity control of 198 m3/ha is required for the redevelopment of Woodbridge Avenue. Oppourtunity to reduce peak flows and provide quantity flood controls through rooftop storage, surface ponding, super pipe storage and underground storage systems. | ● |
| Oppourtunity to provide stormwater quality control | Does not provide stormwater quality control. Water quality downstream may decrease as a result of an increase in impervious surfaces for the proposed redevelopement | | Does not provide stormwater quality control. Water quality downstream may decrease as a result of an increase in impervious surfaces for the proposed redevelopement | | Oppourtunity to provide quality control through a combination of infiltration trenches, swales or vegetated filter strips. It would also be possible to incorporate passive mechanical systems such as OGS units and other filtration systems to provide quality control. | | Oppourtunity to provide quality control through a combination of green roofs, infiltration trenches, swales or vegetated filter strips. It would also be possible to incorporate passive mechanical systems such as OGS units and other filtration systems to provide quality control. | |
| Oppourtunity to improve water balance | Does not improve current water balance as there is an increase in impervious areas which will generate greater run-off | | Does not improve current water balance as there is an increase in impervious areas which will generate greater run-off | | Oppourtunity to improve water balance through lot green roofs, roof leader disconnection, infiltration trenches, swales, rain gardens and permeable pavement. | | Oppourtunity to improve water balance through lot green roofs, roof leader disconnection, infiltration trenches, swales, rain gardens and permeable pavement. | |
| Oppourtunity to mitigate against erosion to watercourses | Unlikely to increase downstream erosion as no quantity control has been established in the area | | Unlikely to increase downstream erosion as no quantity control has been established in the area | | By reducing peak flows and infiltrating more stormwater, downstream existing erosion within Rainbow Creek will not become worse | | By reducing peak flows and infiltrating more stormwater, downstream erosion impacts can reduced | |
| **Natural Environmental** | | | | | | | | |
| Potential impacts to aquatic habitat | The Woodbridge Core Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | ○ | The Woodbridge Core Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | ○ | The Woodbridge Core Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. | ● | The Woodbridge Core Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. | ● |
| Potential impacts to terrestrial habitats | An increase in peak flows may result in flooding which may have a negative impact on terrestrial habitats within the Secondary Plan Area | | An increase in peak flows may result in flooding which may have a negative impact on terrestrial habitats within the Secondary Plan Area | | It is not anticipated there there will be a major impact to terristrial habitat will not be impacted as the majority of lot level SWM controls will be located on private property | | It is not anticipated there there will be a major impact to terristrial habitat will not be impacted as the majority of lot level SWM controls will be located on private property | |
| Potential Impacts to natural features | The Woodbridge Core is currently located in the Humber Watershed Natural Heritage System and has been identified as a special policy area. The City's OP states specific floodproofing measures must be implemented prior to development/redevelopment of special policy areas | | The Woodbridge Core is currently located in the Humber Watershed Natural Heritage System and has been identified as a special policy area. The City's OP states specific floodproofing measures must be implemented prior to development/redevelopment of special policy areas | | The Woodbridge Core is currently located in the Humber Watershed Natural Heritage System and has been identified as a special policy area. All SWM controls to be located at lot level therefore will not impact natural features | | The Woodbridge Core is currently located in the Humber Watershed Natural Heritage System and has been identified as a special policy area. All SWM controls to be located at lot level therefore will not impact natural features | |
| Potential impacts to species of concern | No identified species of concern within the development/redevelopment areas of the secondary plan | | No identified species of concern within the development/redevelopment areas of the secondary plan | | No identified species of concern within the development/redevelopment areas of the secondary plan | | No identified species of concern within the development/redevelopment areas of the secondary plan | |
| **Social/Cultural Environment** | | | | | | | | |
| Potential impacts on public health and safety | As there is existing flooding in the area, an increase in flows as a result of development may further cause flooding problems which is a negative impact on public safety | ○ | As there is existing flooding in the area, an increase in flows as a result of development may further cause flooding problems which is a negative impact on public safety | ○ | Improves public safety by reducing flooding risk by providing lot level quantity control measures | ● | Improves public safety by reducing flooding risk by providing lot level quantity control measures | ● |
| Potential Impacts to private properties | As there is existing flooding in the area, an increase in flows as a result of development may further cause flooding problems which is a negative impact on private properties | | As there is existing flooding in the area, an increase in flows as a result of development may further cause flooding problems which is a negative impact on private properties | | Lot level controls for quantity to be implemented on private properties and these controls have the potential to reduce peak flows and potential flooding | | Lot level controls for quantity to be implemented on private properties and these controls have the potential to reduce peak flows and potential flooding | |
| Potential Impacts to public property | As there is existing flooding in the area, an increase in flows as a result of development may further cause flooding problems which is a negative impact on public properties | | As there is existing flooding in the area, an increase in flows as a result of development may further cause flooding problems which is a negative impact on public properties | | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure | | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure | |
| Potential Impacts to built and cultural heritage landscape | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | |
| Potential Impacts to archaeological resources | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | |
| **Economic Environment** | | | | | | | | |
| Capital costs | No capital costs as there is no SWM to be implemented | ◑ | No capital costs as there is no SWM to be implemented | ◑ | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $75,000 and only address quality control. | ◑ | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $100,000 and only addresses quality control. | ◑ |
| Property acquisitions, permit costs | No property acquistions or permits anticipated | | No property acquistions or permits anticipated | | No property acquistions anticipated. Permits will be required for the construction activities | | No property acquistions anticipated. Permits will be required for the construction activities | |
| Operation and Maintenance costs | No operation and maintenance anticipated | | No operation and maintenance anticipated | | Operation and Maintenance will be required to maintain the efficiency of quantity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approxaimately total annual sediment loadings, it would cost approximately $10,000/year to maintain the OGS units twice per year | | Operation and Maintenance will be required to maintain the efficiency of quantity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approxaimately total annual sediment loadings, it would cost approximately $10,000/year to maintain the OGS units twice per year | |
| Risk management | Possible risks as the cost of doing nothing may be significant due to an increased flooding potential | | Possible risks as the cost of doing nothing may be significant due to an increased flooding potential | | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | |
| **Preferred Alternative** | ○ | | | | ● | | | |

| Woodbridge Core Secondary Plan Area | | | | |
|---|---|---|---|---|
| **Alternative** | **Alternative 3: End of Pipe** | | | |
| **Description** | **Oppourtunity to provide quantity control, quality control, water balance and erosion mitigation through: Dry/Wet Ponds** | | | |
| **Drainage Area** | **Islington Avenue** | **Overall Rank** | **Woodbridge Avenue** | **Overall Rank** |
| **Criteria** | **Quantity - Post-Development flows to be controlled to 5 year existing flows. It is noted that the TRCA's criteria states that there are no quantity control requirements for this protion of the Humber Watershed however due to existing flooding in the area, a more stringent criteria has been applied** | | **Quantity - Enchanced Level I - 80% TSS Removal** | |
| | **Quality - Enchanced Level I - 80% TSS Removal** | | **Water Balance/Erosion - On-site retention of 5 mm** | |
| | **Water Balance/Erosion - On-site retention of 5 mm** | | | |
| **Technical** | | | | |
| Oppourtunity to provide stormwater quantity control and flood protection | Quantity control of 312 m3/ha is required. A wet or dry SWM facility would be able to provide quantity control. | | Quantity control of 198 m3/ha is required. A wet or dry SWM facility would be able to provide quantity control. | |
| Oppourtunity to provide stormwater quality control | A wet SWM facility would be able to provide Enhanced Level I protection | | A wet SWM facility would be able to provide Enhanced Level I protection | |
| Oppourtunity to improve water balance | Challenge to improve water balance at a single end of pipe location. Oppourtunities to improve water balance are typically provided at the lot level throughout the development | | Challenge to improve water balance at a single end of pipe location. Oppourtunities to improve water balance are typically provided at the lot level throughout the development | |
| Oppourtunity to mitigate against erosion to watercourses | Centralised end of pipe facilities have the potential to mitigate downstream erosion | | Centralised end of pipe facilities have the potential to mitigate downstream erosion | |
| **Natural Environmental** | | | | |
| Potential impacts to aquatic habitat | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. The Woodbridge Core Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Discharge from SWM should be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. The Woodbridge Core Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Discharge from SWM should be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | |
| Potential impacts to terrestrial habitats | An end of pipe facility located in a densely developed area may require additional lands which may impact terrestrial habitats. However, reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall terrestrial habitat | | An end of pipe facility located in a densely developed area may require additional lands which may impact terrestrial habitats. However, reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall terrestrial habitat | |
| Potential Impacts to natural features | As the area is currently densly developed, a SWM facility may need to be located within the existing natural features. This is considered acceptable according the City's Official Plan | | As the area is currently densly developed, a SWM facility may need to be located within the existing natural features. This is considered acceptable according the City's Official Plan | |
| Potential impacts to species of concern | No identified species of concern within the development/redevelopment areas of the secondary plan | | No identified species of concern within the development/redevelopment areas of the secondary plan | |
| **Social/Cultural Environment** | | | | |
| Potential impacts on public health and safety | Reducing peak flows, improving water quality and reducing downtream erosion through a centralised end of pipe facility will improve public health and safety. However, large facilities may pose a safety risk. Addtionally, open waters provide potential mosquito breeding zones | | Reducing peak flows, improving water quality and reducing downtream erosion through a centralised end of pipe facility will improve public health and safety. However, large facilities may pose a safety risk. Addtionally, open waters provide potential mosquito breeding zones | |
| Potential Impacts to private properties | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | |
| Potential Impacts to public property | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands. This is particularly important to consider in a densely developed area such as the Woodbridge Core | | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands. This is particularly important to consider in a densely developed area such as the Woodbridge Core | |
| Potential Impacts to built and cultural heritage landscape | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | |
| Potential Impacts to archaeological resources | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | |
| **Economic Environment** | | | | |
| Capital costs | Significant capital costs associated with construction of end of pipe SWM facilities. the estimated pond block size for a quantity/quality facility based on MOE design criteria would be 0.3 ha. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for quality facility is $200,000 | | Significant capital costs associated with construction of end of pipe SWM facilities. the estimated pond block size for a quality facility based on MOE design criteria would be 0.5 ha. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for quality facility is $250,000 | |
| Property acquisitions, permit costs | No property acquistions anticipated. Permits will be required for the construction activities | | No property acquistions anticipated. Permits will be required for the construction activities | |
| Operation and Maintenance costs | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with a facility for this area is $15,000/year | | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with the facility for this area is $16,500/year | |
| Risk management | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | |
| **Preferred Alternative** | | | | |

| | |
|---|---|
| **Most Preferred** | ● |
| **Moderate** | ◑ |
| **Least Preferred** | ○ |

## Kleinburg-Nashville Secondary Plan Area Village of Nashville

| **Alternative** | **Alternative 1: Do Nothing** | | | | **Alternative 2: At Source/Lot Level Controls** | | | |
|---|---|---|---|---|---|---|---|---|
| **Description** | **No implementation of Stormwater Management** | | | | **Oppourtunity to provide quantity control, quality control, water balance and erosion mitigation through: Cisterns, Infiltration Trenches, Swales, Rain Gardens, vegetated filter vegetated filter strips, oil/grit separator units** | | | |
| **Drainage Area** | **Drainage towards existing wetland** | **Overall Rank** | **Drainage towards Nashville Rd. and Block 61W** | **Overall Rank** | **Drainage towards existing wetland** | **Overall Rank** | **Drainage towards Nashville Rd. and Block 61W** | **Overall Rank** |
| **Criteria** | **Quantity - No Controls. It is noted that the TRCA's criteria states that there are no quantity control requirements for this area** | | **Quantity - No Controls** | | **Quantity - Post-Development flows to be controlled to existing peak flow rates. It is noted that the TRCA's criteria states that there are no quantity control requirements for this area.** | | **Quantity - Post-Development flows to be controlled to existing peak flow rates.** | |
| | **Quality - No Controls** | | **Quality - No Controls** | | **Quality - Enchanced Level I - 80% TSS Removal** | | **Quality - Enchanced Level I - 80% TSS Removal** | |
| | **Water Balance/Erosion - No Controls** | | **Water Balance/Erosion - No Controls** | | **Water Balance/Erosion - On-site retention of 5 mm** | | **Water Balance/Erosion - On-site retention of 5 mm** | |
| **Technical** | | | | | | | | |
| Oppourtunity to provide stormwater quantity control and flood protection | No quantity control proposed. Drainage towards existing wetland will be maintained. No anticipated impacts as imperviousness does not significantly increase | | Increase in drainage towards Nashville Road may exceed existing infrastructure capacity and result in flooding. | | Although there is no quantity control requirement there is the oppourtunity to reduce peak flows through the use of cisterns | | Quantity control of 370 m3/ha is required. Oppourtunity to reduce peak flows and provide quantity/flood controls through cisterns. Difficult to implement at every lots as it is up to the discretion of the home owners. | |
| Oppourtunity to provide stormwater quality control | Does not provide stormwater quality control. Water quality downstream may decrease as a result of an increase in impervious surfaces for the proposed redevelopement. Minimum impacts as imperviousness is not changing significantly |  | Does not provide stormwater quality control. Water quality downstream may decrease as a result of an increase in impervious surfaces for the proposed redevelopement |  | Oppourtunity to provide quality control through swales or vegetated filter strips. It would be possible to incorporate passive mechanical systems such as OGS units and other filtration systems to provide quality control. |  | Oppourtunity to provide quality control through swales or vegetated filter strips. It would be possible to incorporate mechanical systems such as OGS units and other filtration systems to provide quality control. |  |
| Oppourtunity to improve water balance | Does not improve current water balance as there is an increase in impervious areas which will generate greater run-off | | Does not improve current water balance as there is an increase in impervious areas which will generate greater run-off | | Oppourtunity to improve water balance through lot grading, rain gardens infiltration trenches, vegetated and buffer strips | | Oppourtunity to improve water balance through lot grading, rain gardens/barrels, infiltration trenches, vegetated and buffer strips, pervious pipe systems and permeable pavement. First 5 mm of storm to be retained on-site for water balance. | |
| Oppourtunity to mitigate against erosion to watercourses | May lead to downstream erosion if point discharges are increased for the proposed development however this is not expected to be significant | | May create downstream erosion if point discharges are increased for the proposed development | | By reducing peak flows and infiltrating more stormwater, downstream erosion can be prevented | | By reducing peak flows and infiltrating more stormwater, downstream erosion impacts can reduced | |
| **Natural Environmental** | | | | | | | | |
| Potential impacts to aquatic habitat | The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | | The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | | The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. Maintaining drainage to the existing wetland and by providing quality control measures improves the aquatic habitat | | The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. | |
| Potential impacts to terrestrial habitats | Extents of development have been limited by the Green Belt. No anticipated negative impacts on terrestrial habitat as peak flows and downstream erosion are not expected to increase significantly |  | Extents of development have been limited by the Green Belt however there may be negative impacts on terrestrial habitat through increased peak flows and downstream erosion |  | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts to terrestrial habitats. |  | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures if they were to be implemented |  |
| Potential Impacts to natural features | Natural features in the area are included under the green belt and is not subject to development | | Natural features in the area are included under the green belt and is not subject to development | | All SWM controls to be located at lot level therefore will not impact natural features | | All SWM controls to be located at lot level therefore will not impact natural features | |
| Potential impacts to species of concern | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | |
| **Social/Cultural Environment** | | | | | | | | |
| Potential impacts on public health and safety | No anticipated impacts to public health and safety | | May impact public safety if the existing culvert located along Nashville Rd. cannot accommodate increased peak flows which may result in flooding | | Improves public safety by reducing flooding risk by providing some lot level quantity control measures | | Improves public safety by reducing flooding risk by providing lot level quantity control measures | |
| Potential Impacts to private properties | No anticipated impacts to private properties | | Potential flood impacts to private properties if culvert along Nashville Rd. cannot accommodate increased peak flows | | Lot level controls to be implemented on private properties. | | Lot level controls to be implemented on private properties. | |
| Potential Impacts to public property | No anticipated impacts to public properties |  | Potential flood impacts to public properties if culvert along Nashville Rd. cannot accommodate increased peak flows |  | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure |  | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure |  |
| Potential Impacts to built and cultural heritage landscape | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | |
| Potential Impacts to archaeological resources | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | |
| **Economic Environment** | | | | | | | | |
| Capital costs | No capital costs as there is no SWM to be implemented | | No capital costs as there is no SWM to be implemented | | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $40,000 and only address quality control. | | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $150,000 and only addresses quality control. | |
| Property acquisitions, permit costs | No property acquistions or permits anticipated |  | No property acquistions or permits anticipated |  | Lot level controls will not require additional property |  | Lot level controls will not require additional property |  |
| Operation and Maintenance costs | No operation and maintenance anticipated | | No operation and maintenance anticipated | | Operation and Maintenance will be required to maintain the efficiency of quantity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approximately total annual sediment loadings, it would cost approximately $10,000/year to maintain the OGS units twice per year | | Operation and Maintenance will be required to maintain the efficiency of quantity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approximately total annual sediment loadings, it would cost approximately $20,000/year to maintain the OGS units twice per year | |
| Risk management | No known risks | | Possible risks as the cost of doing nothing may result in flood damage and downstream erosion | | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | |
| **Preferred Alternative** |  | |  | |  | |  | |

| Kleinburg-Nashville Secondary Plan Area Village of Nashville | | | | |
|---|---|---|---|---|
| **Alternative** | **Alternative 3: End of Pipe** | | | |
| **Description** | **Oppourtunity to provide quantity control, quality control, water balance and erosion mitigation through: Dry/Wet Ponds** | | | |
| **Drainage Area** | **Drainage towards existing wetland** | **Overall Rank** | **Drainage towards Nashville Rd. and Block 61W** | **Overall Rank** |
| **Criteria** | **Quantity - Post-Development flows to be controlled to existing peak flow rates. It is noted that the TRCA's criteria states that there are no quantity control requirements for this area.** | | **Quantity - Post-Development flows to be controlled to existing peak flow rates.** | |
| | **Quality - Enchanced Level I - 80% TSS Removal** | | **Quality - Enchanced Level I - 80% TSS Removal** | |
| | **Water Balance/Erosion - On-site retention of 5 mm** | | **Water Balance/Erosion - On-site retention of 5 mm** | |
| **Technical** | | | | |
| Oppourtunity to provide stormwater quantity control and flood protection | There are no quantity control requirements for the area however, a wet or dry SWM facility would be able to provide quantity control | | Quantity control of 370 m3/ha is required. A wet or dry SWM facility would be able to provide quantity control. It is assumed that the existing pond located in Block 61W can be retrofitted to account for the drainage from the Village of Nashville. | |
| Oppourtunity to provide stormwater quality control | A wet SWM facility would be able to provide Enhanced Level I protection | | A wet SWM facility would be able to provide Enhanced Level I protection | |
| Oppourtunity to improve water balance | Challenge to improve water balance at a single end of pipe location. Oppourtunities to improve water balance are typically provided at the lot level throughout the development | | Challenge to improve water balance at a single end of pipe location. Oppourtunities to improve water balance are typically provided at the lot level throughout the development | |
| Oppourtunity to mitigate against erosion to watercourses | Centralised end of pipe facilities have the potential to mitigate downstream erosion | | Centralised end of pipe facilities have the potential to mitigate downstream erosion | |
| **Natural Environmental** | | | | |
| Potential impacts to aquatic habitat | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Discharge from SWM should be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Discharge from SWM should be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | |
| Potential impacts to terrestrial habitats | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall terrestrial habitat | | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall terrestrial habitat | |
| Potential Impacts to natural features | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts to natural features. | | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts to natural features. | |
| Potential impacts to species of concern | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | |
| **Social/Cultural Environment** | | | | |
| Potential impacts on public health and safety | Reducing peak flows, improving water quality and reducing downtream erosion through a centralised end of pipe facility will improve public health and safety. However, large facilities may pose a danger with respect to drowing. Addtionally, open waters provide potential mosquito breeding zones | | Reducing peak flows, improving water quality and reducing downtream erosion through a centralised end of pipe facility will improve public health and safety. However, large facilities may pose a danger with respect to drowing. Addtionally, open waters provide potential mosquito breeding zones | |
| Potential Impacts to private properties | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | |
| Potential Impacts to public property | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | |
| Potential Impacts to built and cultural heritage landscape | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | |
| Potential Impacts to archaeological resources | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | |
| **Economic Environment** | | | | |
| Capital costs | Significant capital costs associated with construction of end of pipe SWM facilities. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for quality facility is $80,000 assuming the pond block area is approximately 5% of the drainage area | | Significant capital costs associated with construction of end of pipe SWM facilities. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for SWM facility is $600,000 assuming the pond block area is approximately 5% of the drainage area. However, it should be noted that there is the oppourtunity to retrofit the existing pond in Block 61W to account for the drainage from the Village of Nashville | |
| Property acquisitions, permit costs | No property acquistions or permits anticipated | | No property acquistions or permits anticipated | |
| Operation and Maintenance costs | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with the facility for this area is $6,000/year | | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with the facility for this area is $28,500/year | |
| Risk management | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | |
| **Preferred Alternative** | | | | |

| | |
|---|---|
| **Most Preferred** | |
| **Moderate** | |
| **Least Preferred** | |

## Kleinburg-Nashville Secondary Plan Area Huntington Rd. Community

| **Alternative** | **Alternative 1: Do Nothing** | | | | **Alternative 2: At Source/Lot Level Controls** | | | |
|---|---|---|---|---|---|---|---|---|
| **Description** | **No implementation of Stormwater Management** | | | | **Oppourtunity to provide quantity control, quality control, water balance and erosion mitigation through: Rooftop storage, surface ponding, Green Roofs, superpipe storage, cisterns, Infiltration Trenches, Swales, Rain Gardens, vegetated filter vegetated filter strips, permeable pavement, oil/grit separator units** | | | |
| **Drainage Area** | **Drainage towards Huntington Rd. (Sub Basin 36)** | **Overall Rank** | **Drainage towards Main Humber** | **Overall Rank** | **Drainage towards Huntington Rd. (Sub Basin 36)** | **Overall Rank** | **Drainage towards Main Humber** | **Overall Rank** |
| **Criteria** | **Quantity - No Controls** | | **Quantity - No Controls. It is noted that the TRCA's criteria states that there are no quantity control requirements for direct discharges to the Main Humber River** | | **Quantity - Post-Development flows to be controlled to Unit Flow Rates.** | | **Quantity - It is noted that the TRCA's criteria states that there are no quantity control requirements for direct discharges to the East Humber River however at source/lot level controls are proposed to improve existing situation** | |
| | **Quality - No Controls** | | **Quality - No Controls** | | **Quality - Enchanced Level I - 80% TSS Removal** | | **Quality - Enchanced Level I - 80% TSS Removal** | |
| | **Water Balance/Erosion - No Controls** | | **Water Balance/Erosion - No Controls** | | **Water Balance/Erosion - On-site retention of 5 mm** | | **Water Balance/Erosion - On-site retention of 5 mm** | |
| **Technical** | | | | | | | | |
| Oppourtunity to provide stormwater quantity control and flood protection | Increase in drainage towards existing culverts off of Huntington Rd. may cause potential flooding. | ○ | No quantity control requirements for drainage towards main branch of Humber | ○ | Quantity control of 380 m3/ha is required. Oppourtunity to reduce peak flows and provide quantity flood controls through rooftop storage, surface ponding, super pipe storage and cisterns. | ● | Although there is no quantity control requirement there is the oppourtunity to reduce peak flows and provide quantity/flood controls through rooftop storage, super pipe storage, rain barrels, rain gardens and cisterns. | ● |
| Oppourtunity to provide stormwater quality control | Does not provide stormwater quality control. Water quality downstream may decrease as a result of an increase in impervious surfaces for the proposed redevelopement | | Does not provide stormwater quality control. Water quality downstream may decrease as a result of an increase in impervious surfaces for the proposed redevelopement | | Oppourtunity to provide quality control through swales or vegetated filter strips. It would be possible to incorporate passive mechanical systems such as OGS units and other filtration systems to provide quality control. | | Oppourtunity to provide quality control through swales or vegetated filter strips. It would be possible to incorporate mechanical systems such as OGS units and other filtration systems to provide quality control. | |
| Oppourtunity to improve water balance | Does not improve current water balance as there is an increase in impervious areas which will generate greater run-off | | Does not improve current water balance as there is an increase in impervious areas which will generate greater run-off | | Oppourtunity to improve water balance through lot grading, rain gardens/barrels, infiltration trenches, vegetated and buffer strips, pervious pipe systems and permeable pavement. | | Oppourtunity to improve water balance through lot grading, rain gardens/barrels, infiltration trenches, vegetated and buffer strips, pervious pipe systems and permeable pavement. First 5 mm of storm to be retained on-site for water balance. | |
| Oppourtunity to mitigate against erosion to watercourses | May increase downstream erosion previously identified in the Rainbow Creek subwatershed if point discharges are increased for the proposed development | | Unlikely to increase downstream erosion as no quantity control has been established in the area | | By reducing peak flows and infiltrating more stormwater, downstream existing erosion within Rainbow Creek will not become worse | | By reducing peak flows and infiltrating more stormwater, downstream erosion impacts can reduced | |
| **Natural Environmental** | | | | | | | | |
| Potential impacts to aquatic habitat | The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | ○ | The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | ○ | The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. Addtionally, the cooling effects of stormwater through lot level controls is better suited for Redside Dace | ● | The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. Addtionally, the cooling effects of stormwater through lot level controls is better suited for Redside Dace | ● |
| Potential impacts to terrestrial habitats | Extents of development have been limited by the Green Belt however there may be negative impacts on terrestrial habitat through increased peak flows and downstream erosion | | Extents of development have been limited by the Green Belt however there may be negative impacts on terrestrial habitat through increased peak flows and downstream erosion | | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | |
| Potential Impacts to natural features | Natural features in the area are included under the green belt and is not subject to development | | Natural features in the area are included under the green belt and is not subject to development | | All SWM controls to be located at lot level therefore will not impact natural features | | All SWM controls to be located at lot level therefore will not impact natural features | |
| Potential impacts to species of concern | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | |
| **Social/Cultural Environment** | | | | | | | | |
| Potential impacts on public health and safety | May impact public safety if the existing culverts located along Huntington Rd. cannot accommodate increased peak flows which may result in flooding | ○ | No anticipated impacts to public health and safety provided drainage infrastructure is sized accordingly | ○ | Improves public safety by reducing flooding risk by providing lot level quantity control measures | ● | Improves public safety by reducing flooding risk by providing lot level quantity control measures | ● |
| Potential Impacts to private properties | Potential flood impacts to private properties if culverts along Huntington Rd. cannot accommodate increased peak flows | | No anticipated impacts to private properties provided drainage infrastructure is sized accordingly | | Lot level controls for quantity to be implemented on private properties and these controls have the potential to reduce peak flows and potential flooding | | Lot level controls for quantity to be implemented on private properties and these controls have the potential to reduce peak flows and potential flooding | |
| Potential Impacts to public property | Potential flood impacts to public properties if culverts along Huntington Rd. cannot accommodate increased peak flows | | No anticipated impacts to public properties provided drainage infrastructure is sized accordingly | | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure | | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure | |
| Potential Impacts to built and cultural heritage landscape | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | |
| Potential Impacts to archaeological resources | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | |
| **Economic Environment** | | | | | | | | |
| Capital costs | No capital costs as there is no SWM to be implemented | ● | No capital costs as there is no SWM to be implemented | ● | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $200,000 and only address quality control. | ◑ | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $400,000 and only addresses quality control. | ◑ |
| Property acquisitions, permit costs | No property acquistions or permits anticipated | | No property acquistions or permits anticipated | | Lot level controls will not require additional property | | Lot level controls will not require additional property | |
| Operation and Maintenance costs | No operation and maintenance anticipated | | No operation and maintenance anticipated | | Operation and Maintenance will be required to maintain the efficiency of quantity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approximately total annual sediment loadings, it would cost approximately $20,000/year to maintain the OGS units twice per year | | Operation and Maintenance will be required to maintain the efficiency of quantity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approximately total annual sediment loadings, it would cost approximately $30,000/year to maintain the OGS units twice per year | |
| Risk management | Possible risks as the cost of doing nothing may result in flood damage and downstream erosion | | Possible risks as the cost of doing nothing may result in flood damage and downstream erosion | | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | |
| **Preferred Alternative** | ○ | | | | ● | | | |

| Kleinburg-Nashville Secondary Plan Area Huntington Rd. Community | | | | |
|---|---|---|---|---|
| **Alternative** | **Alternative 3: End of Pipe** | | | |
| **Description** | **Oppourtunity to provide quantity control, quality control, water balance and erosion mitigation through: Dry/Wet Ponds** | | | |
| **Drainage Area** | **Drainage towards Huntington Rd. (Sub Basin 36)** | **Overall Rank** | **Drainage towards Main Humber** | **Overall Rank** |
| **Criteria** | **Quantity - Post-Development flows to be controlled to Unit Flow Rates.** | | **Quantity - It is noted that the TRCA's criteria states that there are no quantity control requirements for direct discharges to the East Humber River however a centralised facility is proposed to improve existing situation** | |
| | **Quality - Enchanced Level I - 80% TSS Removal** | | **Quality - Enchanced Level I - 80% TSS Removal** | |
| | **Water Balance/Erosion - On-site retention of 5 mm** | | **Water Balance/Erosion - On-site retention of 5 mm** | |
| **Technical** | | | | |
| Oppourtunity to provide stormwater quantity control and flood protection | Quantity control of 380 m3/ha is required. A wet or dry SWM facility would be able to provide quantity control. | | There are no quantity control requirements for the area however, a wet or dry SWM facility would be able to provide quantity control | |
| Oppourtunity to provide stormwater quality control | A wet SWM facility would be able to provide Enhanced Level I protection | ● | A wet SWM facility would be able to provide Enhanced Level I protection | ● |
| Oppourtunity to improve water balance | Challenge to improve water balance at a single end of pipe location. Oppourtunities to improve water balance are typically provided at the lot level throughout the development | | Challenge to improve water balance at a single end of pipe location. Oppourtunities to improve water balance are typically provided at the lot level throughout the development | |
| Oppourtunity to mitigate against erosion to watercourses | Centralised end of pipe facilities have the potential to mitigate downstream erosion | | Centralised end of pipe facilities have the potential to mitigate downstream erosion | |
| **Natural Environmental** | | | | |
| Potential impacts to aquatic habitat | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Discharge from SWM should be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. Discharge from SWM should be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | |
| Potential impacts to terrestrial habitats | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall terrestrial habitat | ● | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall terrestrial habitat | ● |
| Potential Impacts to natural features | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts to natural features. | | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts to natural features. | |
| Potential impacts to species of concern | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | |
| **Social/Cultural Environment** | | | | |
| Potential impacts on public health and safety | Reducing peak flows, improving water quality and reducing downtream erosion through a centralised end of pipe facility will improve public health and safety. However, large facilities may pose a danger with respect to drowing. Addtionally, open waters provide potential mosquito breeding zones | | Reducing peak flows, improving water quality and reducing downtream erosion through a centralised end of pipe facility will improve public health and safety. However, large facilities may pose a danger with respect to drowing. Addtionally, open waters provide potential mosquito breeding zones | |
| Potential Impacts to private properties | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | |
| Potential Impacts to public property | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | ◑ | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | ◑ |
| Potential Impacts to built and cultural heritage landscape | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | |
| Potential Impacts to archaeological resources | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | |
| **Economic Environment** | | | | |
| Capital costs | Significant capital costs associated with construction of end of pipe SWM facilities. the estimated pond block size for a quantity/quality facility based on MOE design criteria would be 0.3 ha. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for quality facility is $240,000 | | Significant capital costs associated with construction of end of pipe SWM facilities. the estimated pond block size for a quality facility based on MOE design criteria would be 0.5 ha. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for quality facility is $400,000 | |
| Property acquisitions, permit costs | No property acquistions or permits anticipated | ◑ | No property acquistions or permits anticipated | ◑ |
| Operation and Maintenance costs | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with the facility for this area is $47,000/year | | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with the facility for this area is $115,000/year | |
| Risk management | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | |
| **Preferred Alternative** | ◑ | | | |

| | |
|---|---|
| **Most Preferred** | ● |
| **Moderate** | ◑ |
| **Least Preferred** | ○ |

## Kleinburg-Nashville Secondary Plan Area Kipling Avenue Community

| **Alternative** | **Alternative 1: Do Nothing** | | | | | | **Alternative 2: At Source/Lot Level Controls** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Description** | **No implementation of Stormwater Management** | | | | | | **Oppourtunity to provide quantity control, quality control, water balance and erosion mitigation through: Rooftop storage, Green Roofs, superpipe storage, Rain Barrels, Infiltration Trenches, Swales, Rain Gardens, pervious pipe systems, vegetated filter strips, permeable pavement, oil/grit separator units** | | | | | |
| **Drainage Area** | **Drainage towards tributary of East Humber (5001)** | **Overall Rank** | **Drainage from Special Policy Area** | **Overall Rank** | **Drainage towards Subasin 19** | **Overall Rank** | **Drainage towards tributary of East Humber** | **Overall Rank** | **Drainage from Special Policy Area** | **Overall Rank** | **Drainage towards Subasin 19** | **Overall Rank** |
| **Criteria** | **Quantity - No Controls. It is noted that the TRCA's criteria states that there are no quantity control requirements for direct discharges to the East Humber River**<br>**Quality - No Controls** | | **Quantity - Do Nothing**<br>**Quality - No Controls** | | **Quantity - Do Nothing**<br>**Quality - No Controls** | | **Quantity - It is noted that the TRCA's criteria states that there are no quantity control requirements for direct discharges to the East Humber River however at source/lot level controls are proposed to improve existing situation**<br>**Quality - Enchanced Level I - 80% TSS Removal** | | **Quantity - Post development peak flows to be controled to unit flow rates specified for Subbasin 19**<br>**Quality - Enchanced Level I - 80% TSS Removal** | | **Quantity - Post development peak flows to be controled to unit flow rates specified for Subbasin 19**<br>**Quality - Enchanced Level I - 80% TSS Removal** | |
| **Technical** | | | | | | | | | | | | |
| Oppourtunity to provide stormwater quantity control and flood protection | No quantity control requirements for drainage towards East Humber | ○ | Increase peak flows towards Kipling Ave. as a result of an increase in imperviousness may result in potential flooding. | ○ | Increase peak flows towards Kipling Ave. as a result of an increase in imperviousness may result in potential flooding. | ○ | Although there is no quantity control requirement there is the oppourtunity to reduce peak flows and provide quantity/flood controls through rain barrels, rain gardens and cisterns. | ● | Quantity control of 600 m3/ha is required. Oppourtunity to reduce peak flows and provide quantity/flood controls through rooftop storage, super pipe storage, rain barrels, rain gardens and cisterns. Difficult to accomplish quantity control exclusively at the lot level. | ◑ | Quantity control of 635 m3/ha is required. Oppourtunity to reduce peak flows and provide quantity/flood controls through rooftop storage, super pipe storage, rain barrels, rain gardens and cisterns. Difficult to accomplish quantity control exclusively at the lot level. | ◑ |
| Oppourtunity to provide stormwater quality control | Does not provide stormwater quality control. Water quality downstream may decrease as a result of an increase in impervious surfaces for the proposed redevelopement | | Does not provide stormwater quality control. Water quality downstream may decrease as a result of an increase in impervious surfaces for the proposed redevelopement | | Does not provide stormwater quality control. Water quality downstream may decrease as a result of an increase in impervious surfaces for the proposed redevelopement | | Oppourtunity to provide quality control through swales or vegetated filter strips. It would be possible to incorporate passive mechanical systems such as OGS units and other filtration systems to provide quality control | | Oppourtunity to provide quality control through swales or vegetated filter strips. It would be possible to incorporate mechanical systems such as OGS units and other filtration systems to provide quality control | | Oppourtunity to provide quality control through swales or vegetated filter strips. It would be possible to incorporate mechanical systems such as OGS units and other filtration systems to provide quality control | |
| Oppourtunity to improve water balance | Does not improve current water balance as there is an increase in impervious areas which will generate greater run-off | | Does not improve current water balance as there is an increase in impervious areas which will generate greater run-off | | Does not improve current water balance as there is an increase in impervious areas which will generate greater run-off | | Oppourtunity to improve water balance through lot grading, rain gardens/barrels, infiltration trenches, vegetated and buffer strips, pervious pipe systems and permeable pavement. First 5 mm of storm to be retained on-site for water balance. | | Oppourtunity to improve water balance through lot grading, rain gardens/barrels, infiltration trenches, vegetated and buffer strips, pervious pipe systems and permeable pavement. First 5 mm of storm to be retained on-site for water balance. | | Oppourtunity to improve water balance through lot grading, rain gardens/barrels, infiltration trenches, vegetated and buffer strips, pervious pipe systems and permeable pavement. First 5 mm of storm to be retained on-site for water balance. | |
| Oppourtunity to mitigate against erosion to watercourses | Unlikely to increase downstream erosion as no quantity control has been established in the area | | May lead to downstream erosion if point discharges are increased for the proposed development | | May lead to downstream erosion if point discharges are increased for the proposed development | | By reducing peak flows and infiltrating more stormwater, downstream erosion impacts can be avoided | | By reducing peak flows and infiltrating more stormwater, downstream erosion impacts can reduced | | By reducing peak flows and infiltrating more stormwater, downstream erosion impacts can reduced | |
| **Natural Environmental** | | | | | | | | | | | | |
| Potential impacts to aquatic habitat | The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | ○ | The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | ○ | The Kleinburg-Nasville Secondary Plan Area is located within the Humber Watershed where Redside Dace have previously been identified. If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | ○ | Redside Dace have previously been identified within the Golden Horseshoe Region of Ontario which includes the City of Vaughan. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. Additionally, the cooling effects of stormwater through lot level controls is better suited for Redside Dace | ● | Redside Dace have previously been identified within the Golden Horseshoe Region of Ontario which includes the City of Vaughan. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. Additionally, the cooling effects of stormwater through lot level controls is better suited for Redside Dace | ● | Redside Dace have previously been identified within the Golden Horseshoe Region of Ontario which includes the City of Vaughan. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. Additionally, the cooling effects of stormwater through lot level controls is better suited for Redside Dace | ● |
| Potential impacts to terrestrial habitats | Extents of development have been limited by the Green Belt and Natural areas however there may be negative impacts on terrestrial habitat through increased peak flows and downstream erosion | | Extents of development have been limited by the Green Belt however there may be negative impacts on terrestrial habitat through increased peak flows and downstream erosion | | Extents of development have been limited by the Green Belt however there may be negative impacts on terrestrial habitat through increased peak flows and downstream erosion | | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | |
| Potential Impacts to natural features | Natural features in the area are included under the green belt and are not subject to development | | Natural features in the area are included under the green belt and are not subject to development | | Natural features in the area are included under the green belt and are not subject to development | | All SWM controls to be located at lot level therefore will not impact natural features | | All SWM controls to be located at lot level therefore will not impact natural features | | All SWM controls to be located at lot level therefore will not impact natural features | |
| Potential impacts to species of concern | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | |
| **Social/Cultural Environment** | | | | | | | | | | | | |
| Potential impacts on public health and safety | No anticipated impacts to public health and safety provided drainage infrastructure is sized accordingly | ○ | May impact public safety if the existing culvert located along Kipling Ave. cannot accommodate increased peak flows which may result in flooding | ○ | May impact public safety if the existing culvert located along Kipling Ave. cannot accommodate increased peak flows which may result in flooding | ○ | Improves public safety by reducing flooding risk by providing lot level quantity control measures | ● | Improves public safety by reducing flooding risk by providing lot level quantity control measures | ● | Improves public safety by reducing flooding risk by providing lot level quantity control measures | ● |
| Potential Impacts to private properties | No anticipated impacts to private properties provided drainage infrastructure is sized accordingly | | Potential flood impacts to private properties if culvert along Kipling Avenue cannot accommodate increased peak flows | | Potential flood impacts to private properties if culvert along Kipling Avenue cannot accommodate increased peak flows | | Lot level controls for quantity to be implemented on private properties and these controls have the potential to reduce peak flows and potential flooding | | Lot level controls for quantity to be implemented on private properties and these controls have the potential to reduce peak flows and potential flooding | | Lot level controls for quantity to be implemented on private properties and these controls have the potential to reduce peak flows and potential flooding | |
| Potential Impacts to public property | No anticipated impacts to public properties provided drainage infrastructure is sized accordingly | | Potential flood impacts to public properties if culvert along Kipling Ave. cannot accommodate increased peak flows | | Potential flood impacts to public properties if culvert along Kipling Ave. cannot accommodate increased peak flows | | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure | | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure | | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure | |
| Potential Impacts to built and cultural heritage landscape | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | |
| Potential Impacts to archaeological resources | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | |
| **Economic Environment** | | | | | | | | | | | | |
| Capital costs | No capital costs as there is no SWM to be implemented | ● | No capital costs as there is no SWM to be implemented | ● | No capital costs as there is no SWM to be implemented | ● | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $100,000 and only address quality control. | ◑ | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $100,000 and only addresses quality control. | ◑ | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $500,000 and only addresses quality control. | ◑ |
| Property acquisitions, permit costs | No property acquistions or permits anticipated | | No property acquistions or permits anticipated | | No property acquistions or permits anticipated | | Lot level controls will not require additional property | | Lot level controls will not require additional property | | Lot level controls will not require additional property | |
| Operation and Maintenance costs | No operation and maintenance anticipated | | No operation and maintenance anticipated | | No operation and maintenance anticipated | | Operation and Maintenance will be required to maintain the efficiency of quantity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approxaimately total annual sediment loadings, it would cost approximately $12,000/year to maintain the OGS units twice per year | | Operation and Maintenance will be required to maintain the efficiency of quantity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approxaimately total annual sediment loadings, it would cost approximately $10,000/year to maintain the OGS units twice per year | | Operation and Maintenance will be required to maintain the efficiency of quantity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approxaimately total annual sediment loadings, it would cost approximately $30,000/year to maintain the OGS units | |
| Risk management | Possible risks as the cost of doing nothing may result in flood damage and downstream erosion | | Possible risks as the cost of doing nothing may result in flood damage and downstream erosion | | Possible risks as the cost of doing nothing may result in flood damage and downstream erosion | | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | |
| **Preferred Alternative** | ○ | | ○ | | ○ | | ● | | ◑ | | ◑ | |

| Kleinburg-Nashville Secondary Plan Area Kipling Avenue Community | | | | | | |
|---|---|---|---|---|---|---|
| **Alternative** | **Alternative 3: End of Pipe** | | | | | |
| **Description** | **Oppourtunity to provide quantity control, quality control, water balance and erosion mitigation through: Dry/Wet Ponds** | | | | | |
| **Drainage Area** | **Drainage towards tributary of East Humber** | **Overall Rank** | **Drainage from Special Policy Area** | **Overall Rank** | **Drainage towards Subasin 19** | **Overall Rank** |
| **Criteria** | **Quantity - It is noted that the TRCA's criteria states that there are no quantity control requirements for direct discharges to the East Humber River however at source/lot level controls are proposed to improve existing situation**<br>**Quality - Enchanced Level I - 80% TSS Removal** | | **Quantity - Post development peak flows to be controled to unit flow rates specified for Subbasin 19**<br>**Quality - Enchanced Level I - 80% TSS Removal** | | **Quantity - Post development peak flows to be controled to unit flow rates specified for Subbasin 19**<br>**Quality - Enchanced Level I - 80% TSS Removal** | |
| **Technical** | | | | | | |
| Oppourtunity to provide stormwater quantity control and flood protection | There are no quantity control requirements for the area however, a wet or dry SWM facility would be able to provide quantity control | | Quantity control of 600 m3/ha is required. A wet or dry SWM facility would be able to provide quantity/quality control. | | Quantity control of 635 m3/ha is required. A wet or dry SWM facility would be able to provide quantity/quality control. In this particular case 2 ponds are proposed on either side of the tributary on site | |
| Oppourtunity to provide stormwater quality control | A wet SWM facility would be able to provide Enhanced Level I protection | ● | A wet SWM facility would be able to provide Enhanced Level I protection | ● | A wet SWM facilities would be able to provide Enhanced Level I protection | ● |
| Oppourtunity to improve water balance | Challenge to improve water balance at a single end of pipe location. Oppourtunities to improve water balance are typically provided at the lot level throughout the development | | Challenge to improve water balance at a single end of pipe location. Oppourtunities to improve water balance are typically provided at the lot level throughout the development | | Challenge to improve water balance at a single end of pipe location. Oppourtunities to improve water balance are typically provided at the lot level throughout the development | |
| Oppourtunity to mitigate against erosion to watercourses | Centralised end of pipe facilities have the potential to mitigate downstream erosion | | Centralised end of pipe facilities have the potential to mitigate downstream erosion | | Centralised end of pipe facilities have the potential to mitigate downstream erosion | |
| **Natural Environmental** | | | | | | |
| Potential impacts to aquatic habitat | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. Redside Dace have previously been identified within the Golden Horseshoe Region of Ontario which includes the City of Vaughan. Discharge from SWM should be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. Redside Dace have previously been identified within the Golden Horseshoe Region of Ontario which includes the City of Vaughan. Discharge from SWM should be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. Redside Dace have previously been identified within the Golden Horseshoe Region of Ontario which includes the City of Vaughan. Discharge from SWM should be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | |
| Potential impacts to terrestrial habitats | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall terrestrial habitat | ● | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall terrestrial habitat | ● | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts. Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall terrestrial habitat | ● |
| Potential Impacts to natural features | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts to natural features. | | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts to natural features. | | Extents of development have been limited by the Green Belt therefore there are no anticipated negative impacts to natural features. | |
| Potential impacts to species of concern | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | | No identified species of concern within the secondary plan | |
| **Social/Cultural Environment** | | | | | | |
| Potential impacts on public health and safety | Reducing peak flows, improving water quality and reducing downtream erosion through a centralised end of pipe facility will improve public health and safety. However, large facilities may pose a safety risk. Addtionally, open waters provide potential mosquito breeding zones | | Reducing peak flows, improving water quality and reducing downtream erosion through a centralised end of pipe facility will improve public health and safety. However, large facilities may pose a safety risk. Addtionally, open waters provide potential mosquito breeding zones | | Reducing peak flows, improving water quality and reducing downtream erosion through a centralised end of pipe facility will improve public health and safety. However, large facilities may pose a safety risk. Addtionally, open waters provide potential mosquito breeding zones | |
| Potential Impacts to private properties | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable landi | | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable landi | | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable landi | |
| Potential Impacts to public property | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable landi | ◑ | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable landi | ◑ | Reducing peak flows and improving water quality through a centralised end of pipe facility will potentially reduce flooding and improve water quality however a facility reduces the amount of developable landi | ◑ |
| Potential Impacts to built and cultural heritage landscape | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | |
| Potential Impacts to archaeological resources | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | |
| **Economic Environment** | | | | | | |
| Capital costs | Significant capital costs associated with construction of end of pipe SWM facilities. the estimated pond block size for a quality facility based on MOE design criteria would be 0.2 ha. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for quality facility is $160,000 | | Significant capital costs associated with construction of end of pipe SWM facilities. the estimated pond block size for a quantity/quality facility based on MOE design criteria would be 0.2 ha. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for quality facility is $160,000 | | Significant capital costs associated with construction of end of pipe SWM facilities. The estimated pond block size for a quality facility based on MOE design criteria would for the two SWM facilities are 0.35 ha and 0.9 ha. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for quality facilities are $280,000 and $720,000 respectively | |
| Property acquisitions, permit costs | No property acquistions or permits anticipated | | No property acquistions or permits anticipated | | No property acquistions or permits anticipated | |
| Operation and Maintenance costs | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with the facility for this area is $20,000/year | ◑ | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with the facility for this area is $10,000/year | ◑ | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with the facility for this area is $83,000/year | ◑ |
| Risk management | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | |
| **Preferred Alternative** | ◑ | | ● | | ● | |

| | |
|---|---|
| **Most Preferred** | ● |
| **Moderate** | ◑ |
| **Least Preferred** | ○ |

## West Vaughan Employment Area

| Alternative | Alternative 1: Do Nothing | | Alternative 2: At Source/Lot Level Controls | | Alternative 3: End of Pipe | | Alternative 4: Combination of Lot Level Controls and End of Pipe | |
|---|---|---|---|---|---|---|---|---|
| **Description** | No implementation of Stormwater Management | | Opportunity to provide quantity control, quality control, water balance and erosion mitigation through: Rooftop storage, Parking lot storage, Green Roofs, disconnection of roof leaders, Rain Barrels, vegetated filter strips, permeable pavement, oil/grit separator units | | Opportunity to provide quantity control, quality control, water balance and erosion mitigation through: Dry/Wet Ponds | | Opportunity to provide quantity control, quality control, water balance and erosion mitigation through a combination of Dry/Wet Ponds along with lot level controls, such as Rooftop storage, Parking lot storage, Green Roofs, disconnection of roof leaders, Rain Barrels, vegetated filter strips, oil/grit separator units | |
| **Criteria** | **Quantity - No Controls**<br>**Quality - No Controls** | **Overall Rank** | **Quantity - Post-Development peak flows to be controlled to existing peak flows**<br>**Quality - Enchanced Level I - 80% TSS Removal** | | **Quantity - Post-Development peak flows to be controlled to existing peak flows**<br>**Quality - Enchanced Level I - 80% TSS Removal** | | **Quantity - Post-Development peak flows to be controlled to existing peak flows**<br>**Quality - Enchanced Level I - 80% TSS Removal** | |
| **Technical** | | | | | | | | |
| Opportunity to provide stormwater quantity control and flood protection | Increase in drainage towards Rainbow Creek, which could worsen existing flooding in the area and put more properties within the floodplain. | | Control post-development peak flows to Unit Flow Rate targets specified for Humber River Sub basin 36. Opportunity to reduce peak flows and provide quantity/flood controls through rooftop storage, super pipe storage, rain barrels, rain gardens and cisterns. | | Control post-development peak flows to Unit Flow Rate targets specified for Humber River Sub basin 36. A wet SWM facility would be able to provide quantity control. | | Control post-development peak flows to Unit Flow Rate targets specified for Humber River Sub basin 36. Lot level controls, such as rooftop storage, parking lot storage, cisterns and rain gardens, as well as end-of-pipe wet SWM facilities would be able to provide quantity control. | |
| Opportunity to provide stormwater quality control | Does not provide stormwater quality control. Water quality downstream may decrease as a result an increase in impervious surfaces for the proposed redevelopement | ○ | Opportunity to provide quality control through green roofs, swales or vegetated filter strips. It would be possible to incorporate passive mechanical systems such as OGS units and other filtration systems to provide quality control. | ● | A wet SWM facility would be able to provide Enhanced Level I protection | ● | A wet SWM facility would be able to provide Enhanced Level I protection | ● |
| Opportunity to improve water balance | Does not improve current water balance as there is an increase in impervious areas and will generate greater run-off | | Opportunity to improve water balance through green roofs, rain barrels and cisterns. A minimum of the first 5 mm of storm to be retained on-site for water balance. | | Challenge to improve water balance at a single end of pipe location. Opportunities to improve water balance are typically provided at the lot level throughout the development | | Challenge to improve water balance at a single end of pipe location. Opportunities to improve water balance are typically provided at the lot level throughout the development | |
| Opportunity to mitigate against erosion to watercourses | May create downstream erosion if point discharges are increased for the proposed development. | | By reducing peak flows and infiltrating more stormwater, downstream erosion can be avoided | | Centralised end of pipe facilities have the potential to mitigate downstream erosion | | By reducing peak flows and infiltrating more stormwater, downstream erosion can be avoided. Centralised end of pipe facilities have the potential to mitigate downstream erosion | |
| **Natural Environmental** | | | | | | | | |
| Potential impacts to aquatic habitat | The West Vaughan Employment Area is within the Humber Watershed where Redside Dace have previously been identified. If no SWM is implemented there may be a negative impact on aquatic habitat due to decrease in water quality and increase in erosion downstream | | Redside Dace have previously been identified within the Humber Watershed. Improvements to water quality through lot level controls and a reduction in downstream erosion through quantity control and water balance has the potential to improve aquatic habitat. Additionally, the cooling effects of stormwater through lot level controls is better suited for Redside Dace | | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. Redside Dace have previously been identified within the Humber River Watershed. Discharge from SWM facilities will be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | | Reducing peak flows, improving water quality and reduced downstream erosion can be accomodated in one centralised facility and improve the overall aquatic habitat. Redside Dace have previously been identified within the Humber River Watershed. Discharge from SWM facilities and lot level controls will be cool, clear flowing water with riffle-pool sequences to provide the ideal habitat for Redside Dace. | |
| Potential impacts to terrestrial habitats | Extents of development have been limited by the natural heritage features identified in the OP. As runoff will be discharged uncontrolled, peak flows and downstream erosion could increase significantly, which would negatively impact terrestrial habitats. | ○ | Extents of development are located outside the natural features (including terrestrial habitat) therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | ● | Extents of development are located outside the natural features (including terrestrial habitat) therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | ● | Extents of development are located outside the natural features (including terrestrial habitat) therefore there are no anticipated negative impacts. Potential improvements to terrestrial habitats by reduced flood risk through quantity control measures | ● |
| Potential Impacts to natural features | Extents of development have been limited by the Natural Heritage corridor as defined in the City's official plan therefore there are no anticipated negative impacts to natural features. | | All SWM controls to be located at lot level therefore will not impact natural features | | Extents of development have been limited by the Natural Heritage corridor as defined in the City's official plan therefore there are no anticipated negative impacts to natural features. | | Extents of development have been limited by the Natural Heritage corridor as defined in the City's official plan therefore there are no anticipated negative impacts to natural features. | |
| Potential impacts to species of concerr | No identified species of concern within the secondary plar | | No identified species of concern within the secondary plar | | No identified species of concern within the secondary plar | | No identified species of concern within the secondary plar | |
| **Social/Cultural Environment** | | | | | | | | |
| Potential impacts on public health and safety | May impact public safety if the existing channel cannot accommodate increased peak flows which may result in larger flooding areas. Areas downstream of Rainbow Creek would also see an increase in peak flows, which could also increase flooding areas. | | Improves public safety by reducing flooding risk by providing lot level quantity control measures | | Reducing peak flows, improving water quality and reducing downtream erosion through centralised end of pipe facilities will improve public health and safety | | Reducing peak flows, improving water quality and reducing downtream erosion through centralised end of pipe facilities and lot level controls will improve public health and safety | |
| Potential Impacts to private properties | Potential flood impacts to private properties if the existing channel cannot accommodate increased peak flows which may result in larger flooding areas. Areas downstream of Rainbow Creek would also see an increase in peak flows, which could also increase flooding areas. | | Lot level controls to be implemented on High-Rise and Mid-Rise mixed use areas. Controls have the potential to reduce peak flows and potential flooding, improve water quality and reduce downstream erosion | | Reducing peak flows and improving water quality through centralised end of pipe facilities will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | | Reducing peak flows and improving water quality through centralised end of pipe facilities and lot level controls will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | |
| Potential Impacts to public property | Potential flood impacts to public properties if stormsewers along Yonge Street cannot accommodate increased peak flows | ○ | Lot level/at source controls are mostly located on private lands. Improvement in stormwater management on private property will result in improvement on downstream public infrastructure. Controls could potentially be located in park spaces which may enhance their aesthetic value | ● | Reducing peak flows and improving water quality through centralised end of pipe facilities will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | ● | Reducing peak flows and improving water quality through centralised end of pipe facilities and lot level controls will potentially reduce flooding and improve water quality however a facility reduces the amount of developable lands | ● |
| Potential Impacts to built and cultural heritage landscape | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | | No known built or cultural heritage features within secondary plan area | |
| Potential Impacts to archaeological resources | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | | No known archeological resources in secondary plan area | |
| **Economic Environment** | | | | | | | | |
| Capital costs | No capital costs as there is no SWM to be implemented | | Minimal construction activities associated with most lot level controls therefore capital costs are expected to be low. OGS units and filtration systems for the area would be in the order of $5.7 million and only address quality control. | | Significant capital costs associated with construction of end of pipe SWM facilities. the estimated total pond block areas for a quantity/quality facilities based on MOE design criteria would be approximately 28.6 ha. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for quality facilities is $22.9 million. | | Significant capital costs associated with construction of end of pipe SWM facilities. the estimated total pond block areas for a quantity/quality facilities based on MOE design criteria would be approximately 23 ha. Based on an approximately unit cost of $800,000/hectare of pond block area, the cost for quality facilities is $18.4 million. The required OGS units for the remainder of the sites will total approximately $1.2 million, which would total approximately $19.6 million for all of the Plan Area | |
| Property acquisitions, permit costs | No property acquistions or permits anticipated | ● | Lot level controls will not require additional property, and in turn will allow more land to be developed when compared with end of pipe facilities | ○ | No property acquistions anticipated. Permits will be required for the construction activities | ◑ | No property acquistions anticipated. Permits will be required for the construction activities | ● |
| Operation and Maintenance costs | No operation and maintenace anticipated | | Operation and Maintenance will be required to maintain the efficiency of quanitity and quality control of the lot level controls to be implemented. Mechanical quality systems will require maintenance. Based on the approximately total annual sediment loadings, it would cost approximately $500,000/year to maintain the OGS units twice per year | | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with facilities for this area is $1.7 million/year | | The operation and maintenance of end of pipe facilities such as ponds or wetlands is less frequent compared to lot level controls however it can be more difficult and costly. The annual maintenance associated with the end of pipe facilities for this area is approximately $1.36 million/year, and approximately $120,000/year to clean out the OGS units, totalling approximately $1.5 million/year in operations and maintenance costs. | |
| Risk management | Possible risks as the cost of doing nothing may result in flood damage and downstream erosion | | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | | Reduced risk as SWM controls will be implemented | |
| **Adaptation/Climate Change** | | | | | | | | |
| **Preferred Alternative** | ○ | | ◑ | | ◑ | | ● | |

| | |
|---|---|
| **Most Preferred** | ● |
| **Moderate** | ◑ |
| **Least Preferred** | ○ |

# APPENDIX C
# Environmental Assessment Process

# APPENDIX C-1
# Notice Of Commencement

VAUGHAN
Development/Transportation Engineering

# NOTICE OF STUDY COMMENCEMENT

# MASTER PLANS FOR URBAN WATER INFRASTRUCTURE IN VAUGHAN

The City of Vaughan is conducting studies to direct the ongoing development of the City's urban water infrastructure systems that support our communities. These systems include water distribution, wastewater collection and storm water management.

These studies are following the Municipal Servicing Master Plan Class Environmental Assessment (MPCEA) process and will support the City's new Official Plan which was adopted by Council in September 2010. The studies will consider the vision for Vaughan to the year 2031 with sustainability as a key underlying theme.

## MASTER PLAN CLASS ENVIRONMENTAL ASSESSMENT PROCESS

The City has awarded contracts for the following Master Plan studies to be undertaken concurrently:

- City-Wide Storm Drainage/Storm Water Management Master Plan (Cole Engineering Group Limited); and
- City-Wide Water/Wastewater Master Plan (The Municipal Infrastructure Group Ltd. and Fabian Papa & Partners Inc.).

The MPCEA process includes public and review agency consultation, an assessment of the problem and opportunities (Phase 1), evaluation of alternative solutions, assessment of potential effects on the environment, and identification of reasonable measures to mitigate the adverse effects. The preferred solution(s) will be determined based on engineering requirements, environmental considerations, public input and information gathered during the studies (Phase 2). Subsequent Municipal Class Environmental Assessment work will be required at a later time for the ultimate implementation of the preferred solutions.

## CONSULTATION

A key component of the MPCEA studies will be consultation with interested stakeholders (public, landowners and regulatory agencies). Opportunities to provide input to the planning and design process will be provided throughout the studies. This Notice of Study Commencement is being issued to notify the public of the studies and invite comment. To further facilitate public input, two Public Information Centres (PICs) will be held as part of the studies. The first PIC will present the alternative servicing strategies and receive public input prior to evaluating the alternatives. The notices of the PICs will be published in local newspapers with details of the location and time. At the completion of the MPCEA process, a comprehensive Municipal Servicing Master Plan will be filed for public review.

In addition, a website dedicated to these studies has been established (www.vaughaninfrastructure.ca). The Study Team is interested in receiving any comments or input that you may have about the studies. Material will be maintained on file for use during the studies and may be included in study documentation. Should you have any questions or comments, require further information, or wish to be added to the study mailing list, please visit the project website which includes detailed contact information specific to each of the studies. The contact information for the City's Project Manager is as follows:

**Michael Frieri**, C.E.T., Manager of Engineering Planning & Studies
Development/Transportation Engineering Department
2141 Major Mackenzie Drive, Vaughan, ON L6A 1T1
Tel: 905-832-8585 Ext. 8729 Fax: 905-832-6145
E-Mail: michael.frieri@vaughaninfrastructure.ca

Please note that information related to these studies will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments received will become part of the public record and may be included in study documentation prepared for public review. Thank you for your interest in these studies.

**ANDREW PEARCE,**
**Director of Development/ Transportation Engineering, City of Vaughan**

*This Notice issued September 14, 2011*

COLE ENGINEERING
fabian papa & partners
The MUNICIPAL INFRASTRUCTURE Group

September 15, 2011

Organization
Address
Address
City, Province. Postal Code
Attn: Name

**Re: City of Vaughan**
**City-Wide Urban Water Infrastructure Master Plan Studies**
**Notice of Study Commencement**

Please find enclosed the combined Notice of Study Commencement for the City of Vaughan City Wide Urban Water Infrastructure Master Plan Studies, consisting of two separate studies that are being undertaken concurrently:

| **City-Wide Storm Drainage/Storm Water Management Master Plan** | **City-Wide Water/Wastewater Master Plan** |
|---|---|
| *(Cole Engineering Group Limited)* | *(The Municipal Infrastructure Group Ltd, and Fabian Papa & Partners Inc)* |

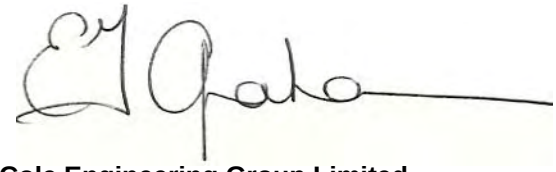
The City of Vaughan is inviting comment from the public and review agencies on the planning and design of this project.

If you have any questions, please do not hesitate to contact:

Mr. Michael Frieri, C.E.T.
Manager of Engineering Planning and Studies
Development/Transportation Engineering Department
The City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON. L6A 1T1

Tel: 905-832-8585, ext 8729
Fax: 905-832-6145
Michael.Frieri@VaughanInfrastructure.ca

Yours truly,



**Cole Engineering Group Limited**
Edward Graham, M.A.Sc., P.Eng.
SWMMP@VaughanInfrastructure.ca

**The Municipal Infrastructure Group Ltd. and Fabian Papa & Partners Inc.**
Fabian Papa, M.A.Sc., M.B.A., P.Eng.
WWWMP@VaughanInfrastructure.ca

# NOTICE OF STUDY COMMENCEMENT

## MASTER PLANS FOR URBAN WATER INFRASTRUCTURE IN VAUGHAN

The City of Vaughan is conducting studies to direct the ongoing development of the City's urban water infrastructure systems that support our communities. These systems include water distribution, wastewater collection and storm water management.

These studies are following the Municipal Servicing Master Plan Class Environmental Assessment (MPCEA) process and will support the City's new Official Plan which was adopted by Council in September 2010. The studies will consider the vision for Vaughan to the year 2031 with sustainability as a key underlying theme.

### MASTER PLAN CLASS ENVIRONMENTAL ASSESSMENT PROCESS

The City has awarded contracts for the following Master Plan studies to be undertaken concurrently:

- City-Wide Storm Drainage/Storm Water Management Master Plan (Cole Engineering Group Limited); and
- City-Wide Water/Wastewater Master Plan (The Municipal Infrastructure Group Ltd. and Fabian Papa & Partners Inc.).

The MPCEA process includes public and review agency consultation, an assessment of the problem and opportunities (Phase 1), evaluation of alternative solutions, assessment of potential effects on the environment, and identification of reasonable measures to mitigate the adverse effects. The preferred solution(s) will be determined based on engineering requirements, environmental considerations, public input and information gathered during the studies (Phase 2). Subsequent Municipal Class Environmental Assessment work will be required at a later time for the ultimate implementation of the preferred solutions.

### CONSULTATION

A key component of the MPCEA studies will be consultation with interested stakeholders (public, landowners and regulatory agencies). Opportunities to provide input to the planning and design process will be provided throughout the studies. This Notice of Study Commencement is being issued to notify the public of the studies and invite comment. To further facilitate public input, two Public Information Centres (PICs) will be held as part of the studies. The first PIC will present the alternative servicing strategies and receive public input prior to evaluating the alternatives. The notices of the PICs will be published in local newspapers with details of the location and time. At the completion of the MPCEA process, a comprehensive Municipal Servicing Master Plan will be filed for public review.

In addition, a website dedicated to these studies has been established (www.vaughaninfrastructure.ca). The Study Team is interested in receiving any comments or input that you may have about the studies. Material will be maintained on file for use during the studies and may be included in study documentation. Should you have any questions or comments, require further information, or wish to be added to the study mailing list, please visit the project website which includes detailed contact information specific to each of the studies. The contact information for the City's Project Manager is as follows:

**Michael Frieri**, C.E.T., Manager of Engineering Planning & Studies
Development/Transportation Engineering Department
2141 Major Mackenzie Drive, Vaughan, ON L6A 1T1
Tel: 905-832-8585 Ext. 8729 Fax: 905-832-6145
E-Mail: michael.frieri@vaughaninfrastructure.ca

Please note that information related to these studies will be collected in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments received will become part of the public record and may be included in study documentation prepared for public review. Thank you for your interest in these studies.

**ANDREW PEARCE, Director of Development/ Transportation Engineering, City of Vaughan**
*This Notice issued September 15, 2011*

# APPENDIX C-2
# Notice Of Public Information Centre # 1

VAUGHAN
Development/Transportation Engineering

# NOTICE OF PUBLIC INFORMATION CENTRE NO. 1

# MASTER PLANS FOR URBAN WATER INFRASTRUCTURE IN VAUGHAN

The City of Vaughan is conducting studies to direct the ongoing development of the City's urban water infrastructure systems that support our communities. These systems include water distribution, wastewater collection and storm water management.

These studies are following the Municipal Servicing Master Plan Class Environmental Assessment (MPCEA) process and will support the City's new Official Plan which was adopted by Council in September 2010. The studies will consider the vision for Vaughan to the year 2031 with sustainability as a key underlying theme.

## MASTER PLAN CLASS ENVIRONMENTAL ASSESSMENT PROCESS

The City has awarded contracts for the following Master Plan studies to be undertaken concurrently:

- City-Wide Storm Drainage/Storm Water Management Master Plan (Cole Engineering Group Limited); and
- City-Wide Water/Wastewater Master Plan (The Municipal Infrastructure Group Ltd. and Fabian Papa & Partners Inc.).

The MPCEA process includes public and review agency consultation, an assessment of the problem and opportunities (Phase 1), evaluation of alternative solutions, assessment of potential effects on the environment, and identification of reasonable measures to mitigate the adverse effects. The preferred solution(s) will be determined based on engineering requirements, environmental considerations, public input and information gathered during the studies (Phase 2). Subsequent Municipal Class Environmental Assessment work will be required at a later time for the ultimate implementation of the preferred solutions.

## PUBLIC INFORMATION CENTRE DETAILS

A joint public information centre (PIC) has been scheduled to present the process that is being employed for the studies, and to identify the existing conditions, needs, and justification. The PIC will provide stakeholders with an opportunity to review and comment on the study information.

Public comment obtained at the PIC will be incorporated into the next phase of the study, which is the selection of the preferred solutions for water servicing, wastewater servicing, and stormwater management. The PIC has been scheduled for:

**Date:** Thursday, October 13, 2011
**Time:** 7:00 to 9:00 p.m.
**Location:** Vaughan City Hall
Multi-Purpose Room, Level 100
**Address:** 2141 Major Mackenzie Drive, Vaughan, ON L6A 1T1

Following the PIC, the material presented at the meeting will be posted on the City of Vaughan's Infrastructure Planning website at **www.VaughanInfrastructure.ca**. For further information, please contact:

**Michael Frieri**, C.E.T., Manager of Engineering Planning & Studies
Development/Transportation Engineering Department
2141 Major Mackenzie Drive, Vaughan, ON L6A 1T1
Tel: 905-832-8585 Ext. 8729 Fax: 905-832-6145
E-Mail: Michael.Frieri@VaughanInfrastructure.ca

Please note that information related to these studies will be collected in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments received will become part of the public record and may be included in study documentation prepared for public review. Thank you for your interest in these studies.

**ANDREW PEARCE, Director of Development/ Transportation Engineering, City of Vaughan**

*This Notice issued September 29, 2011*

COLE ENGINEERING
fabian papa & partners
The MUNICIPAL INFRASTRUCTURE Group

# APPENDIX C-3
# Public Information Centre # 1

VAUGHAN
Development/Transportation Engineering

# INFORMATION PACKAGE

## MASTER PLANS FOR URBAN WATER INFRASTRUCTURE IN VAUGHAN

In 2007, Council approved the Terms of Reference for the new Vaughan (City-Wide) Official Plan, a component of the City's Consolidated Growth Management Strategy to a planning horizon of 2031. The new Official Plan updates the City's community planning policies in a manner consistent with the principles of sustainability. Now that the framework for continued urban growth to 2031 is unfolding through the new Official Plan, it is appropriate for the City to undertake the preparation of City-wide urban water infrastructure master plan studies. Two concurrent master plan studies are required, one for water and wastewater infrastructure and one for storm drainage and storm water management.

Both master plan studies are being conducted in accordance with the Master Plan process as outlined in the Municipal Engineers Association Municipal Class Environmental Assessment (MPCEA) document (October 2000, as amended in 2007). The MPCEA process includes public and review agency consultation, an assessment of the problem and opportunities, evaluation of alternative solutions, assessment of potential effects on the environment, and identification of reasonable measures to mitigate any adverse effects. The preferred solution(s) will be determined based on engineering requirements, environmental considerations, public input and information gathered during the studies.

### STUDY AREA AND TIMING

The Urban Water Infrastructure Master Plan study areas will generally encompass the entire City of Vaughan and will be premised upon a planning horizon of 2031 (consistent with the new Official Plan). Servicing scenarios beyond 2031 will also be considered to efficiently plan for municipal infrastructure requirements in anticipation of full build-out throughout the City.

### STUDY OBJECTIVES

The Water and Wastewater Master Plan will optimize the efficiency of the City's current infrastructure, and identify where and how additional capacity may be provided to address the needs of new development areas outside of the current urban boundary, and redevelopment and intensification within the built boundary. The capacity of the City's existing water and wastewater distribution / collection systems will ultimately rely on the capacities of the Region of York's major trunk water and sewer systems.

The Storm Water Management / Drainage Master Plan will evaluate the effectiveness of the existing stormwater management infrastructure within the City of Vaughan with an additional focus on the Rainbow Creek Subwatershed to identify where and how these infrastructure needs may change to address new development areas outside of the current urban boundary, and development intensification within the built boundary. The study will evaluate the use of alternative SWM practices for effective treatment of stormwater from source, conveyance, and end of pipe controls to promote protection of the natural environmental systems.

### PUBLIC AND AGENCY PARTICIPATION

The public consultation process will involve all individuals and interest groups having a stake in the City's Urban Water Infrastructure Master Plans including, local residents, ratepayer groups, the business community, the development community, public agencies and other special interest groups. A Technical Advisory Committee has also been established to represent interests for specific areas and to provide ongoing input throughout the process.

The first Public Information Centre will be held on Thursday, October 13, 2011. See notice of Public Information Centre (PIC) #1 for additional details.

Comments should be returned in writing. Please address your comments to:

**Michael Frieri**, C.E.T., Manager of Engineering Planning & Studies
Development / Transportation Engineering Department
2141 Major Mackenzie Drive, Vaughan, ON L6A 1T1
Tel: 905-832-8585 Ext. 8729 / Fax: 905-832-6145
E-Mail: Michael.Frieri@VaughanInfrastructure.ca

Comments will be maintained for reference throughout the project and will become part of the public record. Under the Freedom of Information and Protection of Privacy Act and the Environmental Assessment Act, unless otherwise stated in the submission, any personal information such as name, address, telephone number and property location included in a submission will become part of the public record files for this matter and will be released, if requested, to any person.

# NOTICE OF PUBLIC INFORMATION CENTRE NO. 1

## MASTER PLANS FOR URBAN WATER INFRASTRUCTURE IN VAUGHAN

The City of Vaughan is conducting studies to direct the ongoing development of the City's urban water infrastructure systems that support our communities. These systems include water distribution, wastewater collection and storm water management.

These studies are following the Municipal Servicing Master Plan Class Environmental Assessment (MPCEA) process and will support the City's new Official Plan which was adopted by Council in September 2010. The studies will consider the vision for Vaughan to the year 2031 with sustainability as a key underlying theme.

### MASTER PLAN CLASS ENVIRONMENTAL ASSESSMENT PROCESS

The City has awarded contracts for the following Master Plan studies to be undertaken concurrently:

- City-Wide Storm Drainage / Storm Water Management Master Plan (Cole Engineering Group Limited); and,
- City-Wide Water / Wastewater Master Plan (The Municipal Infrastructure Group Ltd. and Fabian Papa & Partners Inc.).

The MPCEA process includes public and review agency consultation, an assessment of the problem and opportunities (Phase 1), evaluation of alternative solutions, assessment of potential effects on the environment, and identification of reasonable measures to mitigate the adverse effects. The preferred solution(s) will be determined based on engineering requirements, environmental considerations, public input and information gathered during the studies (Phase 2). Subsequent Municipal Class Environmental Assessment work will be required at a later time for the ultimate implementation of the preferred solutions.

### PUBLIC INFORMATION CENTRE DETAILS

A joint public information centre (PIC) has been scheduled to present the process that is being employed for the studies, and to identify the existing conditions, needs, and justification. The PIC will provide stakeholders with an opportunity to review and comment on the study information.

Public comment obtained at the PIC will be incorporated into the next phase of the study, which is the selection of the preferred solutions for water servicing, wastewater servicing, and stormwater management. The PIC has been scheduled for:

| | |
|---|---|
| **Date:** | Thursday, October 13, 2011 |
| **Time:** | 7:00 p.m. to 9:00 p.m. |
| **Location:** | Vaughan City Hall<br>Multi-Purpose Room, Level 100 |
| **Address:** | 2141 Major Mackenzie Drive, Vaughan, ON L6A 1T1 |

Following the PIC, the material presented at the meeting will be posted on the City of Vaughan's Infrastructure Planning website at **www.VaughanInfrastructure.ca**. For further information, please contact:

Michael Frieri, C.E.T., Manager of Engineering Planning & Studies
Development / Transportation Engineering Department
2141 Major Mackenzie Drive, Vaughan, ON L6A 1T1
Tel: 905-832-8585 Ext. 8729 / Fax: 905-832-6145
E-Mail: Michael.Frieri@VaughanInfrastructure.ca

Please note that information related to these studies will be collected in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments received will become part of the public record and may be included in study documentation prepared for public review. Thank you for your interest in these studies.

**ANDREW PEARCE, Director of Development/ Transportation Engineering, City of Vaughan**
*This Notice issued September 29, 2011*

VAUGHAN
Development/Transportation Engineering

# REGISTRATION SHEET

**Public Information Centre #1 – Master Plans for Urban Water Infrastructure in Vaughan Municipal Class Environmental Assessment**

**Thursday October 13, 2011 – City of Vaughan**

| Name (Please Print) | Address/E-mail | Phone Number |
|---|---|---|
| 1. Elliot WAJCHENDLER | | |
| 2. MILAD ZARAK | | |
| 3. SAM SALARI | | |
| * 4. Abeer Ansari | | |
| 5. Aaron Heuchert | | |
| 6. SHAFQAT ALI ICHAN | | |
| 7. David Brand | | |
| 8. Marco Zuccaro | | |
| 9. Mario Zuccaro | | |
| 10. FRANK GRECO | | |

COLE ENGINEERING

fabian papa & partners

The MUNICIPAL INFRASTRUCTURE Group

VAUGHAN
Development/Transportation Engineering

# REGISTRATION SHEET

**Public Information Centre #1 – Carruthers Creek Flood Management and Analysis Municipal Class Environmental Assessment**

**Thursday December 9, 2010 – Town of Ajax Council Chambers**

| Name (Please Print) | Address/E-mail | Phone Number |
|---|---|---|
| 11. ANDREW PEARCE | | |
| 12. Jack Graziosi | | |
| 13. HAROLD REINTHALER | | |
| 14. MaHBell | | |
| 15. Rosemarie Humphries | | |
| 16. Stephen Roberts | | |
| 17. | | |
| 18. | | |
| 19. | | |
| 20. | | |

COLE ENGINEERING

fabian papa & partners

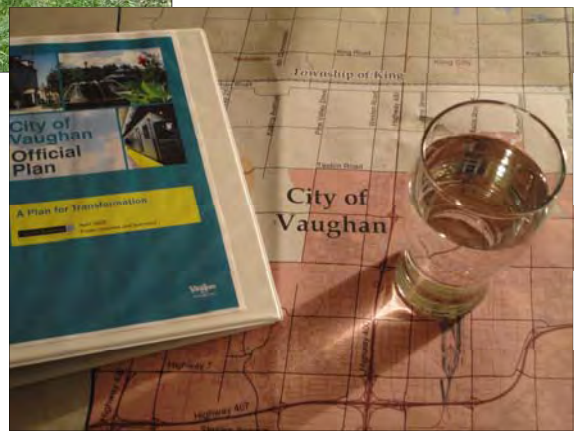
The MUNICIPAL INFRASTRUCTURE Group

# PUBLIC INFORMATION CENTRE No. 1

## CITY OF VAUGHAN CITY-WIDE URBAN WATER INFASTRUCTURE MASTER PLANS
## Water/Wastewater Master Plan
## Storm Drainage / Storm Water Management Master Plan

### THURSDAY OCTOBER 13, 2011
### 7:00 p.m. to 9:00 p.m.

- Please sign in on the sheet provided. Then feel free to walk around and view the displays.
- The purpose of this Public Information Centre (PIC) is to introduce you to the projects, inform you of the progress to date, and obtain your comments on the project.
- The major elements presented today are:
  - Overview of the Class Environmental Assessment Process
  - Background Information
  - Study Objectives
  - Problem /Opportunity Statements
- If you have any questions, our representatives will be pleased to discuss the project with you.
- The Study Teams are interested in receiving any comments that you may have about the Studies.
- Should you have any questions or comments, require further information, or wish to be added to the study mailing lists, please contact one of the Study Team members.



# PUBLIC INFORMATION CENTRE No. 1

## CITY OF VAUGHAN CITY-WIDE URBAN WATER INFASTRUCTURE MASTER PLANS
## Water/Wastewater Master Plan
## Storm Drainage / Storm Water Management Master Plan

THURSDAY OCTOBER 13, 2011
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- The Study Teams are interested in receiving any comments that you may have about the Studies.
- Should you have any questions or comments, require further information, or wish to be added to the study mailing lists, please contact one of the Study Team members.

# Study Team Structure

**PROJECT MANAGER**
Michael Frieri
City of Vaughan

**TECHNICAL ADVISORY COMMITTEE**
-York Region
-Toronto and Region Conservation Authority
-Other Vaughan Divisions

**VAUGHAN**
**WATER / WASTEWATER TEAM**
Michael Frieri
Tony Artuso
Robert Mayer

**THE MUNICIPAL INFRASTRUCTURE GROUP**
**FABIAN PAPA & PARTNERS**
Fabian Papa (FP&P)
Eric Tuson (TMIG)
Kevin Brown (TMIG)

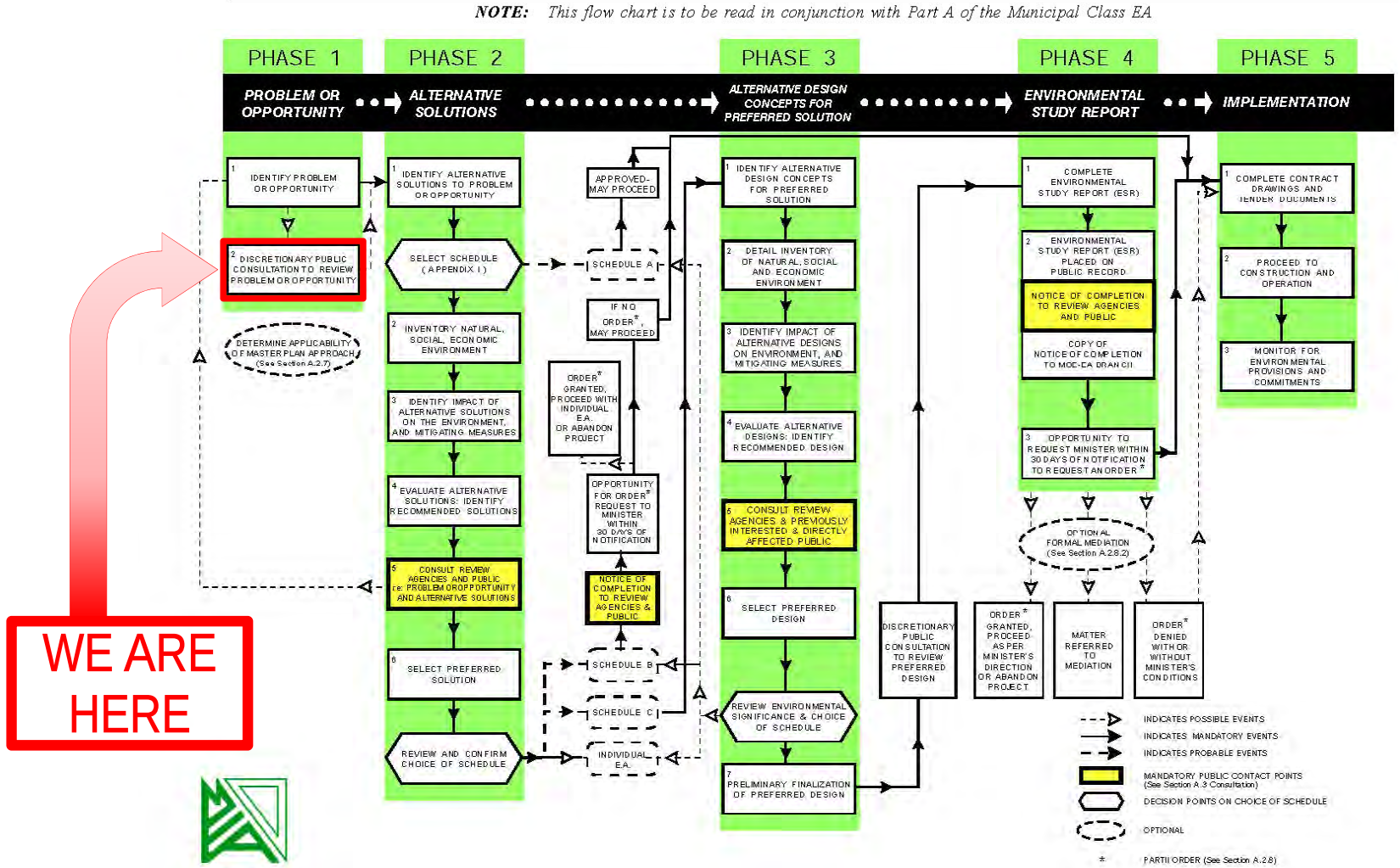
**VAUGHAN**
**STORM WATER TEAM**
Saad Yousaf
Carlos Couto
Robert Mayer

**COLE ENGINEERING GROUP**
Edward Graham (Cole)
Geoff Masotti (Cole)
Arun Hindupur (Cole)

# Overview of the Class Environmental Assessment Process

## Master Plan Class EA

The Studies are being conducted in accordance with the Master Plan process as outlined in the *Municipal Engineers Association Municipal Class Environmental Assessment* document (October 2000, as amended in 2007).

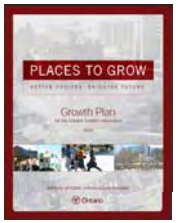


# Other Studies

Within the City of Vaughan, there are a number of completed and ongoing studies that were reviewed and referenced as part of these Master Plans. A summary of those studies is provided below.


## Vaughan Official Plan

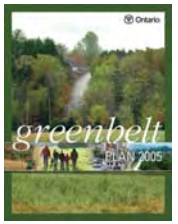
The New Official Plan was completed and adopted by City Council in September 2010, a component of the City's Consolidated Growth Management Strategy to a planning horizon of 2031. The new Official Plan updates the City's community planning policies in a manner consistent with the principles of sustainability.




## Places to Grow

The Provincial 2006 Growth Plan for the Greater Golden Horseshoe forecasts that the population within York Region will grow to 1,500,000 by 2031 and that the number of jobs will increase to 780,000. Within Vaughan specifically, this translates to a **2031 population of 417,000** (growth of 168,000 over 2006 population), and **261,000 jobs** (increase of 102,000).

This will be achieved through a combination of expansion to the existing urban boundary and also through intensification within existing built-up areas. The Places to Grow Act and the Growth Plan provided the basis for the updates to the Official Plan.




## Greenbelt Plan

The Greenbelt Plan was established in 2005 under the Greenbelt Act. The City of Vaughan includes lands that are part of the Greenbelt. The Greenbelt Plan acknowledges the need to maintain existing infrastructure to serve existing land uses and the need for additional infrastructure to support future growth. All new infrastructure that will be within the Greenbelt must comply with specific policies prior to implementation.

## Green Directions Vaughan

Green Directions Vaughan is the City's Community Sustainability and Environmental Master Plan (CSEMP). It influences virtually all aspects of the City's operational and regulatory activities, including the growth management strategy. The plan establishes the principles of sustainability to be used in the development of other plans and master plans to achieve a healthy natural environment, vibrant communities and a strong economy.

## Vaughan Transportation Master Plan

The Transportation Master Plan will define the road and public transit infrastructure, and other initiatives, which are needed to accommodate the population and employment growth that will result from the implementation of the Growth Management strategy.

## Black Creek Optimization Study

The overall goal of the Black Creek Optimization Study is to address the ongoing flooding, water quality and channel erosion issues that have been identified within that Study Area.

## York Water/Wastewater Master Plan

In November 2009, York Region updated their Water and Wastewater Master Plan. As the Region supplies water to the City and collects and treats the City's wastewater, the recommendations of the Water/Wastewater Master Plan need to be compared with those of the Region's Master Plan to ensure consistency.

# Community Sustainability and Environmental Master Plan

Green Directions Vaughan was designed to establish the principles of **sustainability** in Vaughan, and will be considered through these Master Plans to help achieve a healthy natural environment, vibrant communities and a strong economy. Green Directions provides two distinct functions:

1. it creates a series of sustainability action plans to guide the City's operational and regulatory functions; and
2. it acts as the City's first Integrated Community Sustainability Plan.

**There are six key goals outlined in the plan:**

**1** To significantly reduce our use of natural resources and the amount of waste we generate

**2** To ensure sustainable development and redevelopment

**3** To ensure that Vaughan is a City that is easy to get around with a low environmental impact

**4** To create a vibrant community where citizens, businesses and visitors thrive

**5** To be leaders in advocacy and education on sustainability issues

**6** To ensure a supportive system for the implementation of Green Directions


The **Water/Wastewater Master Plan** and the **Storm Drainage / Storm Water Management Master Plan** will both strive to achieve the goals of Green Directions through:

- ongoing consultation with the Region, TRCA, the Development Community, and the General Public; and,
- consideration of established and emerging technologies to achieve waste reduction and sustainability goals.

# Study Objectives

## Water/Wastewater Master Plan

The Water and Wastewater Master Plan will optimize the efficiency of the City's current infrastructure, and identify where and how additional capacity may be provided to address the needs of new development areas, as well as redevelopment and intensification within the built boundary.

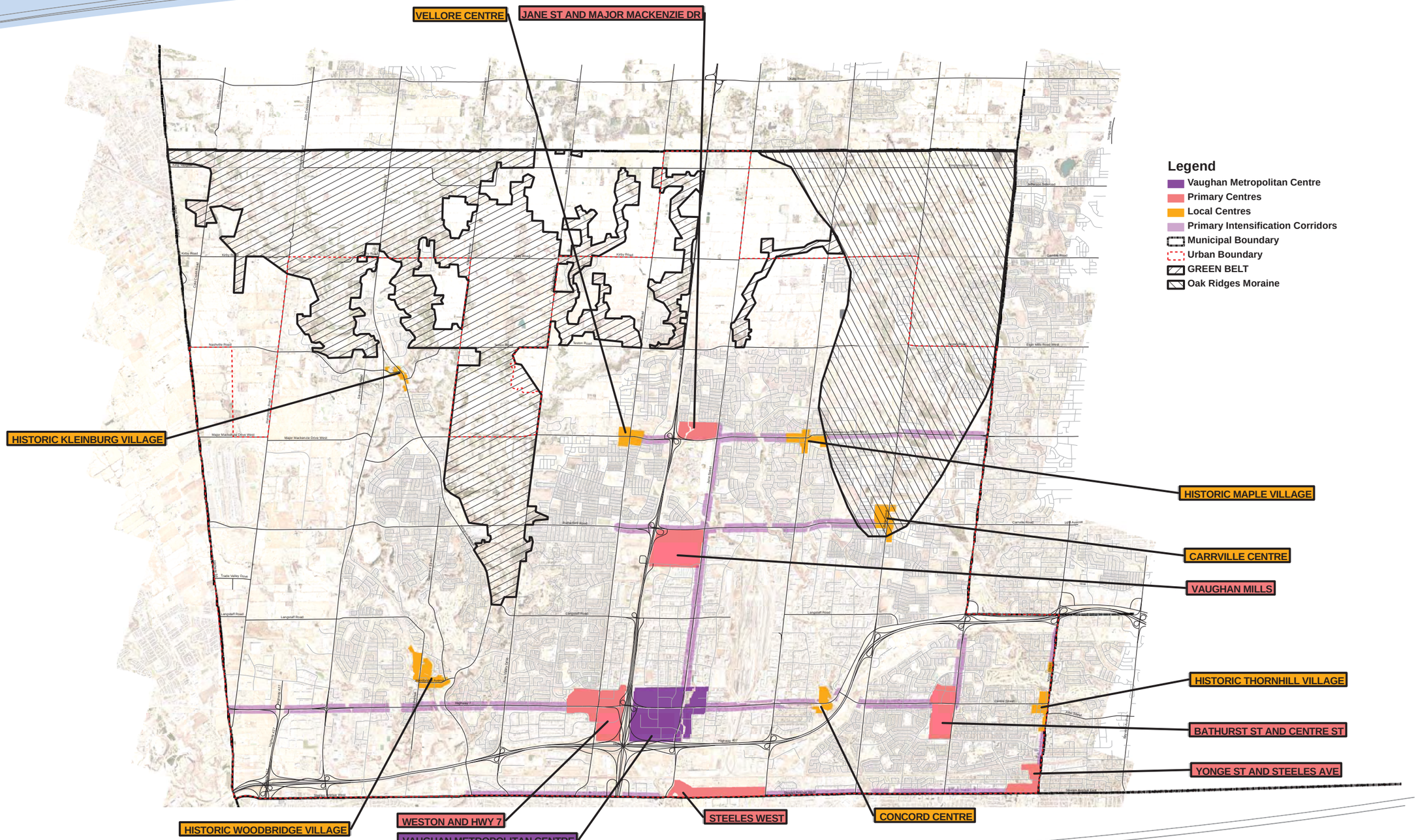
The ability of the City's existing water and wastewater distribution/collection systems to service growth will ultimately rely on the capacities of the Region of York's major trunk water and sewer systems.

## Storm Drainage / Storm Water Management Master Plan

The Storm Drainage / Storm Water Management Master Plan will evaluate the effectiveness of the existing storm water management infrastructure within the City of Vaughan with an additional focus on the Rainbow Creek Watershed to identify where and how these infrastructure needs may change to address new development areas outside of the current urban boundary, and redevelopment and intensification within the built boundary.

The study will evaluate the use of alternative SWM practices for effective treatment of storm water from source, conveyance, and end of pipe controls to promote protection of the natural environmental systems.

# Intensification Areas

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green directions VAUGHAN
Vaughan Tomorrow
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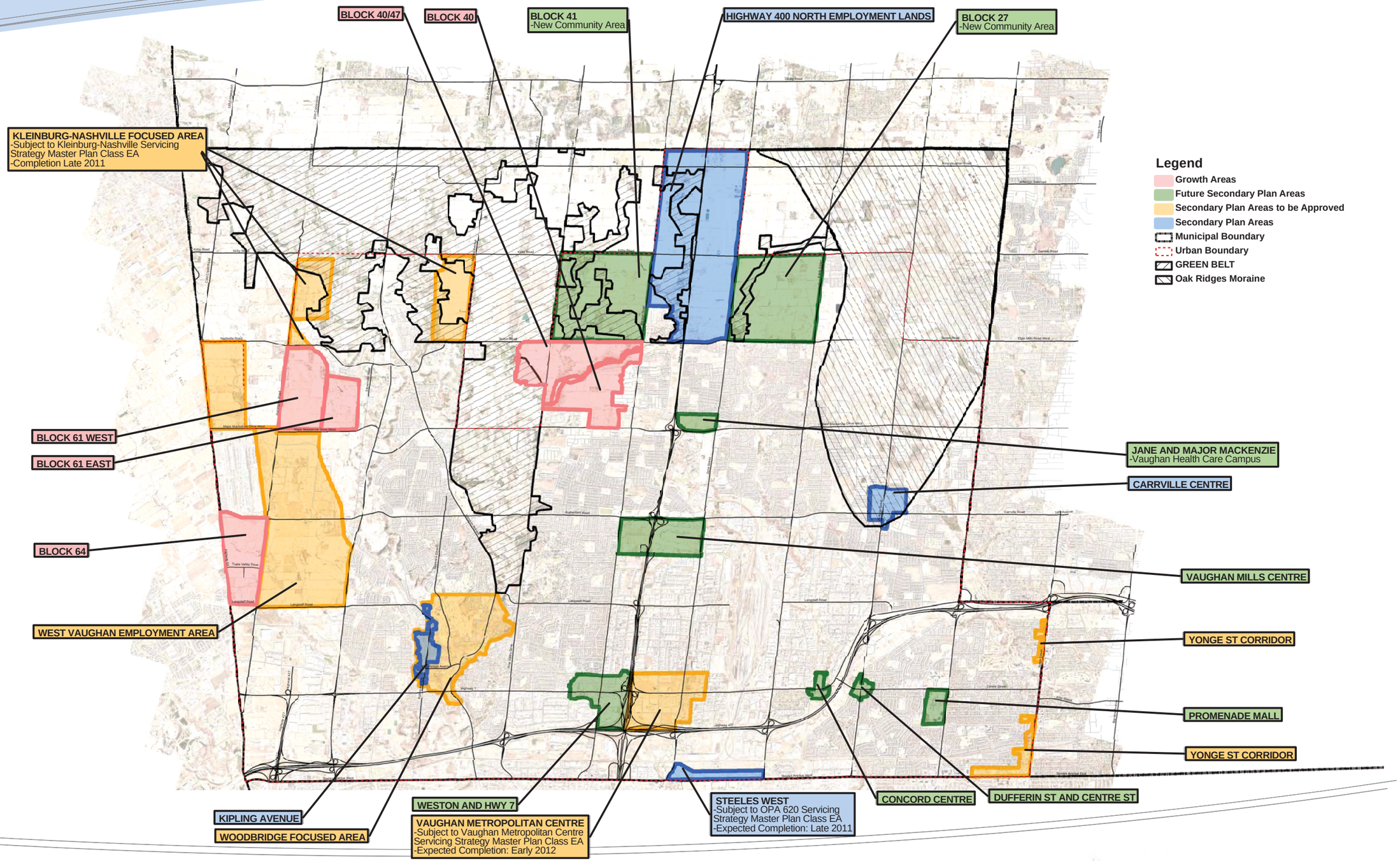
fabian papa & partners

City-Wide Water/Wastewater Master Plan
City-Wide Storm Drainage / Storm Water Management Master Plan
Public Information Centre #1  October 13, 2011

# Secondary Plan Areas

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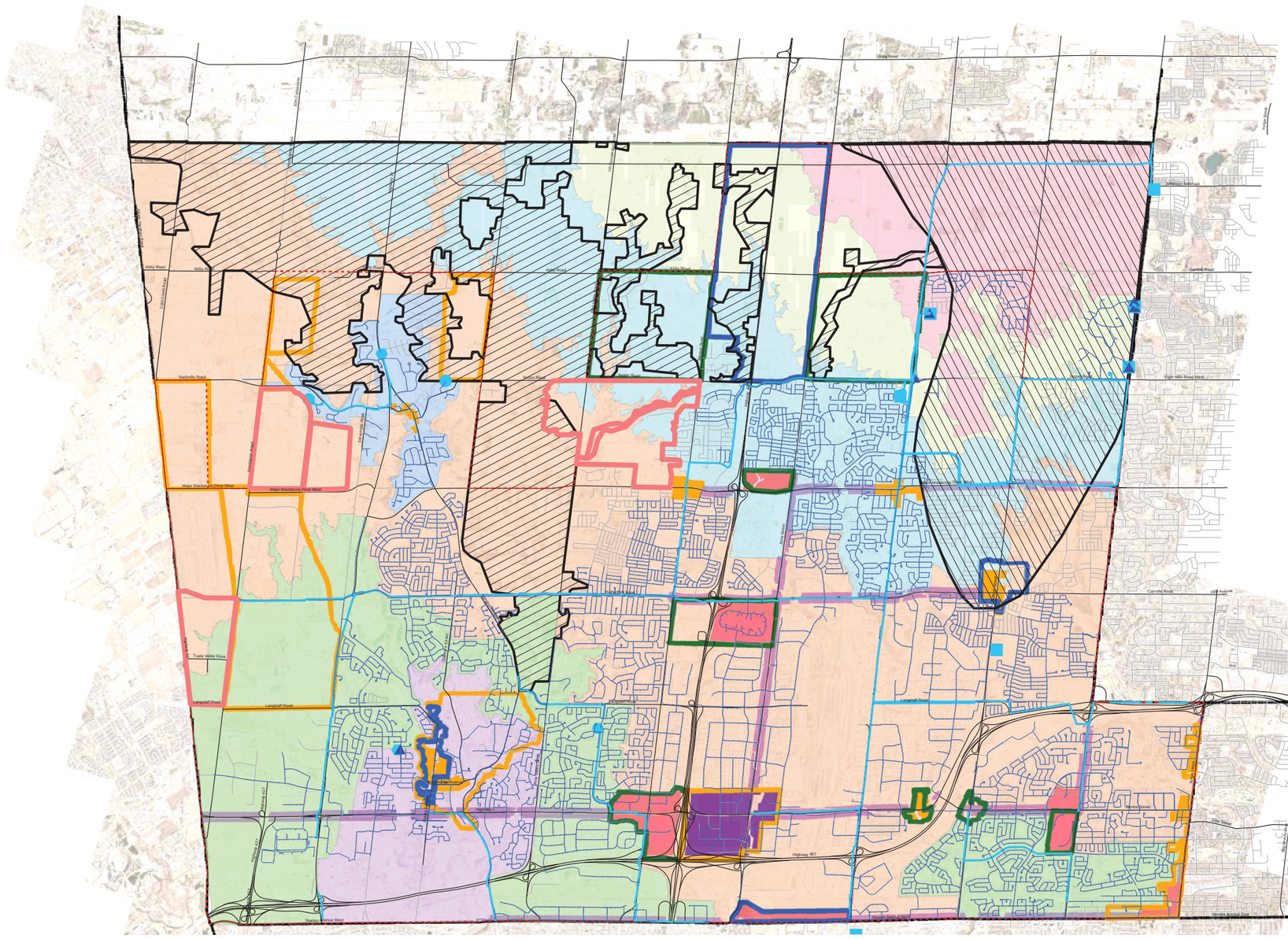
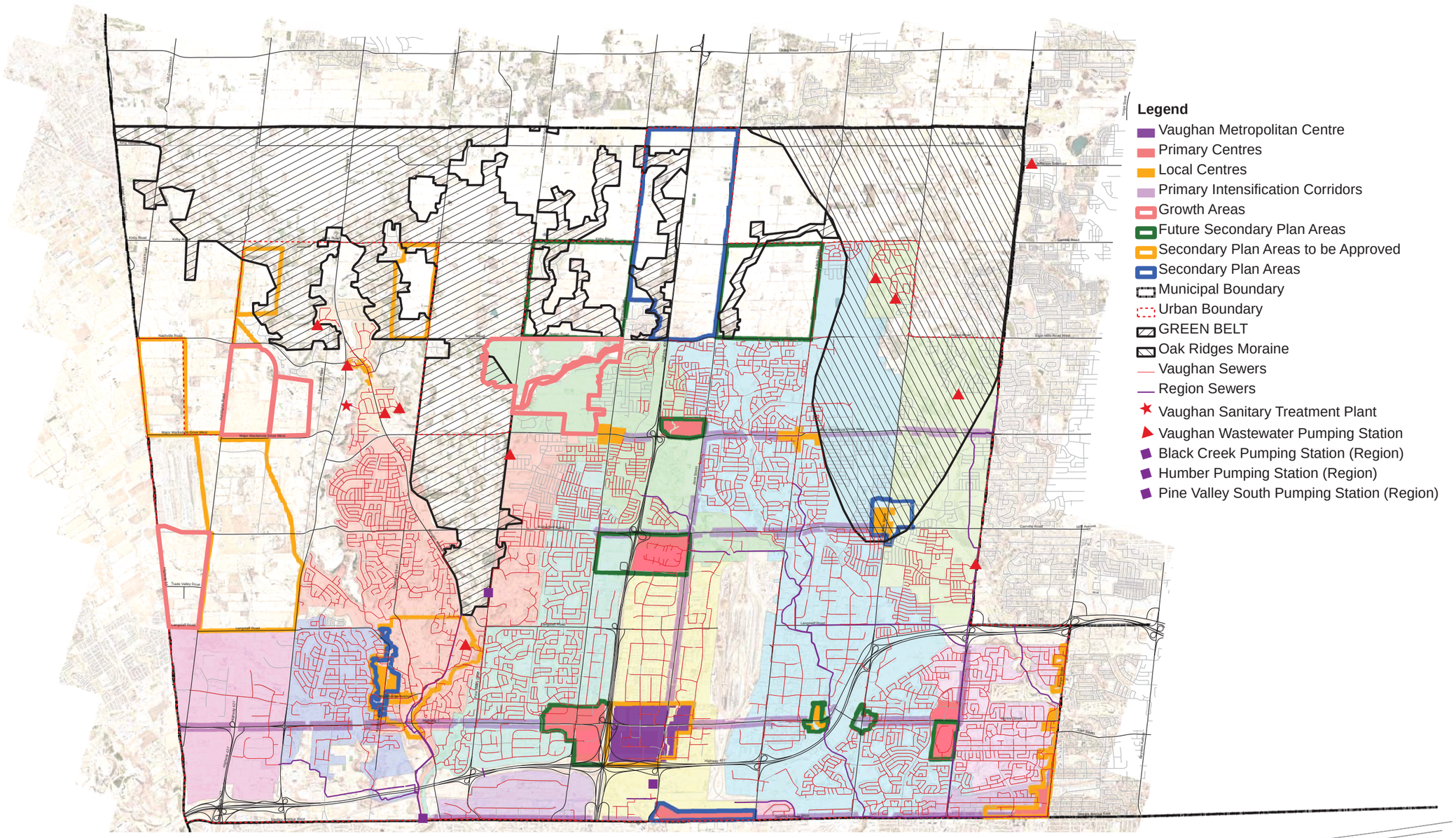
# Existing Water System



# Existing Wastewater System



# Water/Wastewater Problem/Opportunity Statements

## Problem/Background

Like many towns and cities throughout Ontario, the City of Vaughan has recently adopted a new City-Wide Official Plan. In Vaughan, the New Official Plan is part of an overall Growth Management Strategy, initiated by Council, that will "shape the future of the City and guide its continued transformation into a vibrant, beautiful and sustainable City".

The New Official Plan was completed and adopted by City Council in September 2010, and as such the City is now interested in undertaking a City-Wide Water/Wastewater Master Plan Environmental Assessment Study (MPEA) to complement the New Official Plan and to establish the water and wastewater infrastructure required to support the build-out of the New Official Plan.

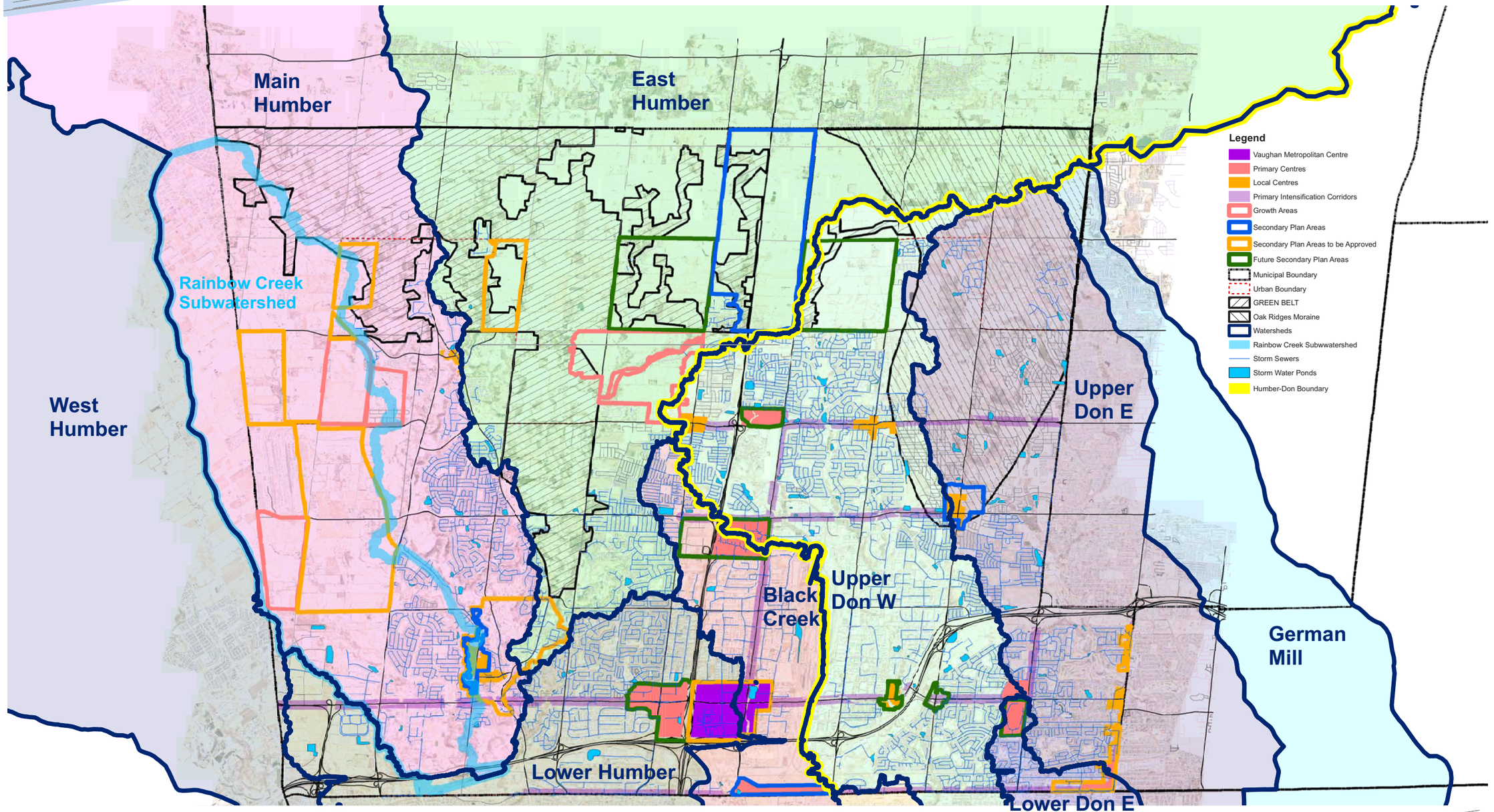
**The Water and Wastewater Master Plan will identify alternative infrastructure planning and implementation strategies and select the preferred alternative to meet the City's growth needs**, premised upon a time horizon of 2031. Servicing scenarios beyond 2031 will also be considered to efficiently plan for municipal infrastructure requirements in anticipation of full urbanization and build-out of remaining white belt lands throughout the City.

This Water and Wastewater Master Plan is to be co-ordinated and integrated with the Region of York's Water/Wastewater Master Plan Update (2009) as well as the City's principles of sustainability as established in the Community Sustainability and Environmental Master Plan (CSEMP) called Green Directions Vaughan.

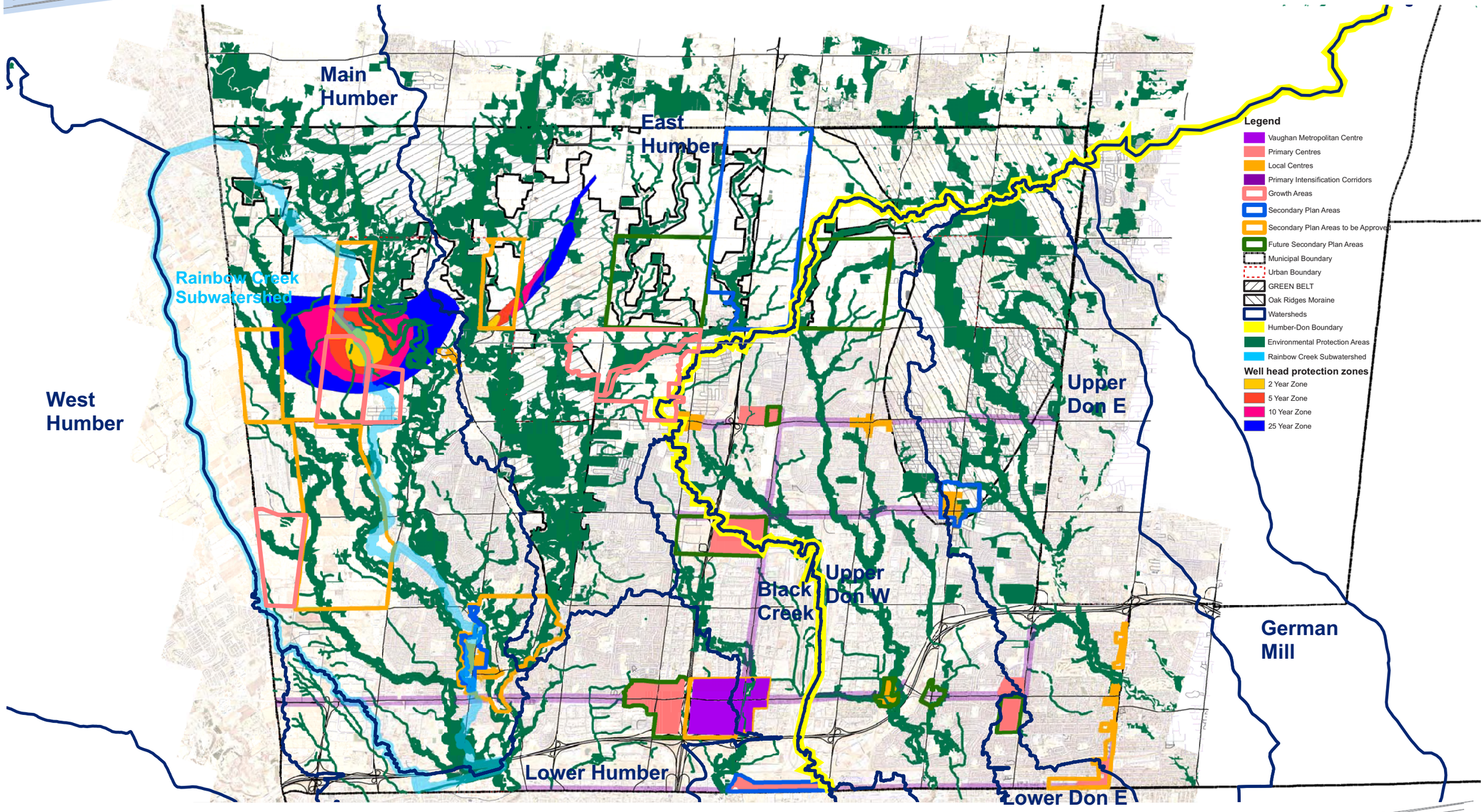
## Opportunity

This project also presents the opportunity to re-assess the City's design criteria and **explore opportunities to maximize the utilization of existing water and wastewater infrastructure**.

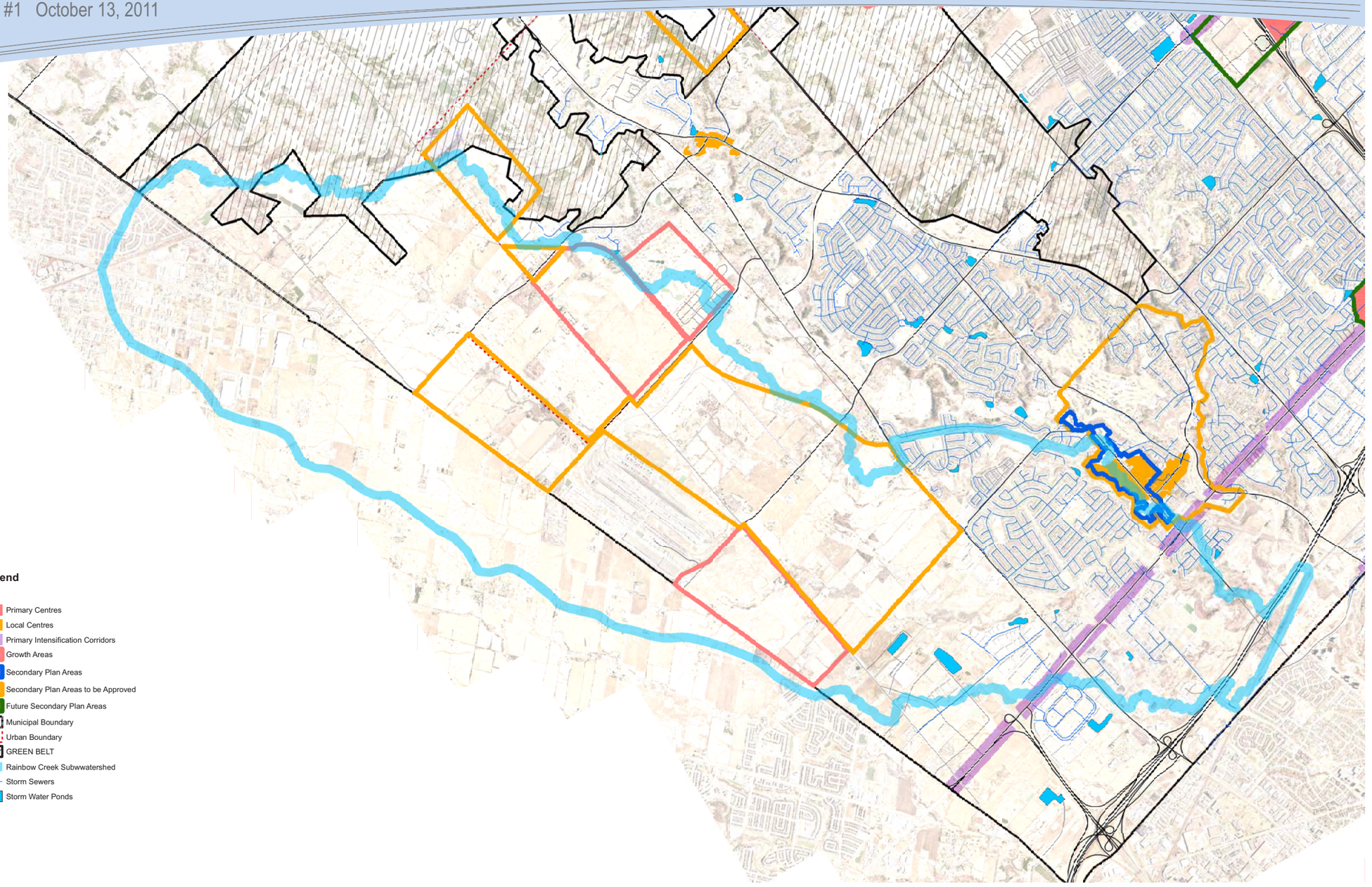
# Existing Storm Water System



# Environmental Protection Areas



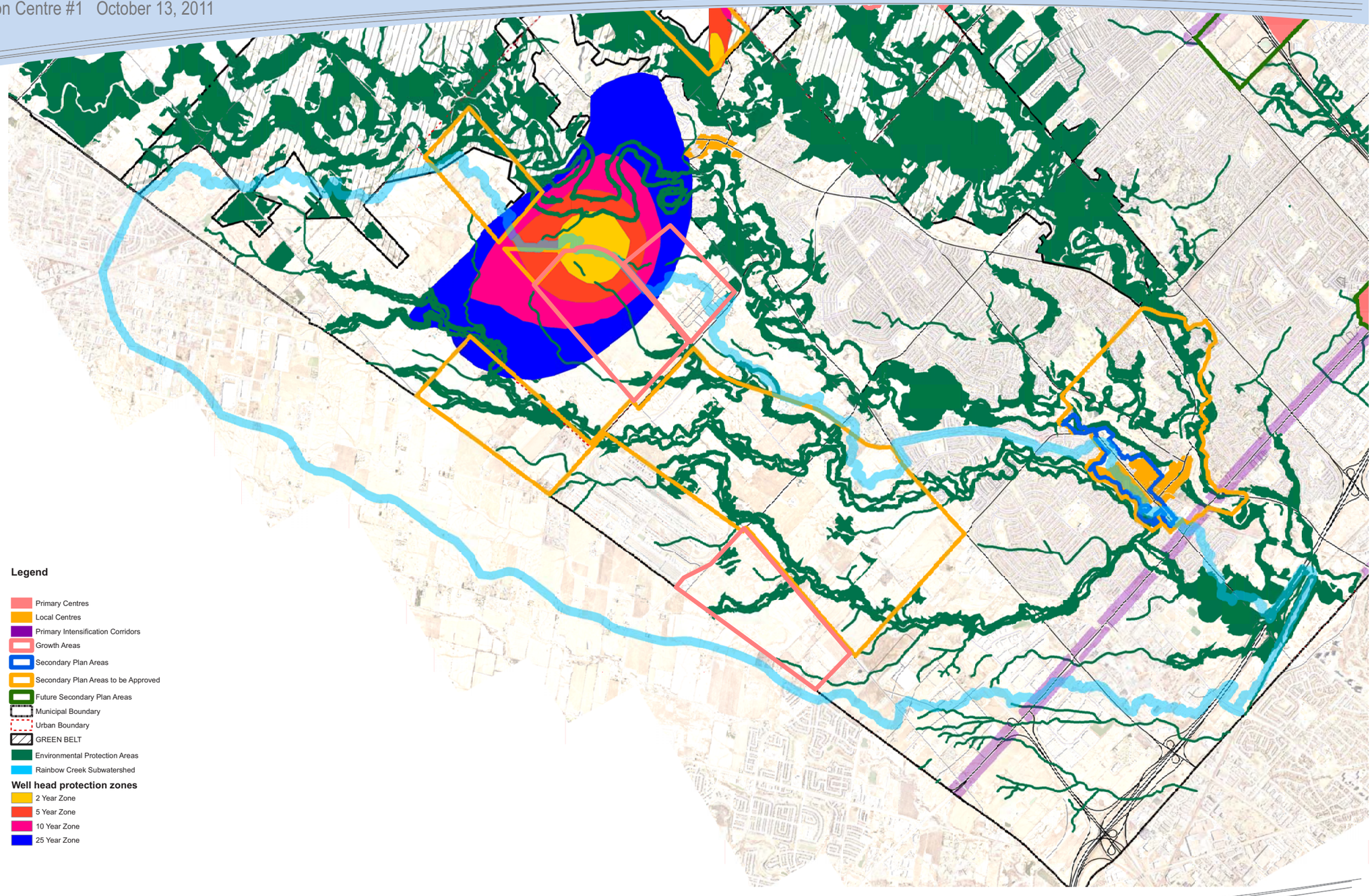
# Rainbow Creek - Existing Storm Water System



**Legend**

- Primary Centres
- Local Centres
- Primary Intensification Corridors
- Growth Areas
- Secondary Plan Areas
- Secondary Plan Areas to be Approved
- Future Secondary Plan Areas
- Municipal Boundary
- Urban Boundary
- GREEN BELT
- Rainbow Creek Subwwatershed
- Storm Sewers
- Storm Water Ponds

# Rainbow Creek - Environmental Protection Areas



**Legend**

- Primary Centres
- Local Centres
- Primary Intensification Corridors
- Growth Areas
- Secondary Plan Areas
- Secondary Plan Areas to be Approved
- Future Secondary Plan Areas
- Municipal Boundary
- Urban Boundary
- GREEN BELT
- Environmental Protection Areas
- Rainbow Creek Subwatershed

**Well head protection zones**

- 2 Year Zone
- 5 Year Zone
- 10 Year Zone
- 25 Year Zone

# Storm Water Problem/Opportunity Statements

## Problem/Background

In September of 2010 Vaughan Council adopted the new City-Wide Official Plan, a component of the Vaughan Consolidated Growth Management Strategy – 2031. The Official Plan represents an update to the City's community planning policies in a manner consistent with the principles of sustainability. The City is now proceeding with the preparation of a City-Wide Storm Drainage/Storm Water Management (SWM) Master Plan Class Environmental Assessment Study (MPCEA) to complement the new Official Plan and direct the required storm water management infrastructure improvements to support the build-out of the new Official Plan.

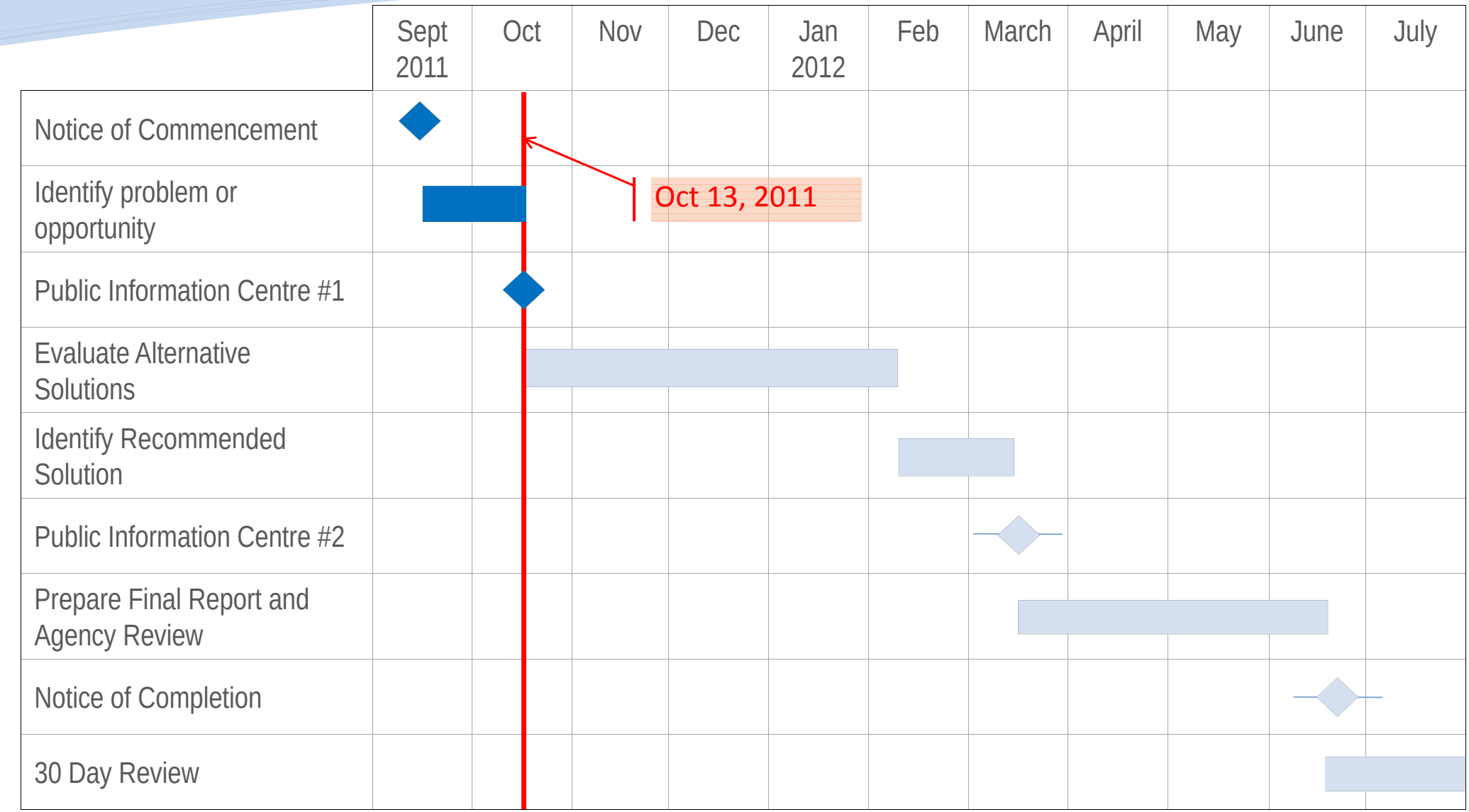
As part of the overall SWM MPCEA, the City is also undertaking an update study to the Rainbow Creek Master Plan. The Toronto and Region Conservation Authority (TRCA) has been working with the City of Vaughan to rehabilitate and enhance the environmental conditions in deteriorated streams in urbanized areas including Rainbow Creek watershed. The City is committed to developing and implementing a regeneration plan for the Rainbow Creek watershed.

## Opportunity

This project presents the opportunity to prepare a storm water management planning and guidance document to support and direct development in compliance with the City of Vaughan's Official Plan and policies of the Toronto Region Conservation Authority to improve and determine the best management practices for storm water management as well as to support future intensification as mandated by the Province of Ontario.

The update to Rainbow Creek Master Plan study presents the opportunity for regeneration that will not only improve the environmental conditions within the creek and valley system but will provide reasonable protection against accelerated erosion rates and flooding while protecting municipal infrastructure and property.

# Project Schedule




Legend: Completed Milestone/Task Future Milestone/Task

# Next Steps

- Comments from this Public Information Centre will be considered along with those received from review agencies. Please provide your comments on a comment sheet and place it in the Comment Box, or send it to us by fax, e-mail or mail by October 31, 2011.

- The Project Team will establish evaluation criteria with consideration for the natural, social, and economical environment of the study area, as well as the technical criteria.

- Based on the evaluation criteria, the Project Team will identify and evaluate alternative solutions, resulting in recommended solutions for the water, sanitary, and storm water servicing. The preferred alternative will be presented at the second Public Information Centre in Spring 2012.

# Study Teams

## Water/Wastewater Master Plan

**Michael Frieri, C.E.T.**
Manager of Engineering Planning & Studies
Development/Transportation Engineering Department
**City of Vaughan**
2141 Major Mackenzie Drive
Vaughan, ON L6A 1T1
Tel: 905-832-8585 Ext. 8729
Fax: 905-832-6145

**Fabian Papa, M.A.Sc., M.B.A., P.Eng.**
Project Manager
**Fabian Papa & Partners Inc.**
216 Chrislea Road, Suite 501
Woodbridge, ON L4L 8S5
Tel: 905-264-2420 Ext. 410
Fax: 905-264-2441

**Eric Tuson, P.Eng.**
Assistant Project Manager
**The Municipal Infrastructure Group Ltd.**
8800 Dufferin Street, Suite 200
Vaughan, ON L4K 0C5
Tel: 905-738-5700 Ext. 253
Fax: 905-738-0065

WWWMP@VaughanInfrastructure.ca

## Storm Drainage / Storm Water Management Master Plan

**Saad Yousaf, P.Eng.**
Storm Drainage Engineer
Engineering Planning & Studies
**City of Vaughan**
2141 Major Mackenzie Drive
Vaughan, ON L6A 1T1
Tel: 905-832-8585 Ext 8251
Fax: 905-832-6145

**Edward Graham, M.A.Sc., P.Eng.**
Project Manager
**Cole Engineering Group Ltd.**
70 Valleywood Drive
Markham, ON L3R 4T5
Tel: 905-940-6161
Fax: 905-940-2064

**Geoff Masotti, P.Eng.**
Assistant Project Manager
**Cole Engineering Group Ltd.**
70 Valleywood Drive
Markham, ON L3R 4T5
Tel: 905-940-6161
Fax: 905-940-2064

SWMMP@VaughanInfrastructure.ca

Or, visit the Project Website at
**www.VaughanInfrastructure.ca**

# City-Wide Storm Water Master Plan

## COMMENT FORM

**October 13 2011 – Public Information Centre**
**City of Vaughan, 2141 Major Mackenzie Drive, Vaughan ON**

We are interested in hearing any comments you may have associated with this project. Thank you for clearly writing your comments in the space provided below.

This material will be maintained on file for use during the project and may be included in project documentation. Information collected will be used in accordance with the Freedom of Information and Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please submit your written comments before leaving the PIC. If you require more time to comment, please mail/fax in the comment sheet by October 31, 2011 to:


Saad Yousaf, P.Eng.
Storm Drainage Engineer
Engineering Planning & Studies
City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON L6A 1T1
Tel: 905-832-8585 ext 8251
Fax: 905-832-6145

Edward Graham, M.A.Sc, P.Eng.
Project Manager
Cole Engineering Group Ltd.
70 Valleywood Drive
Markham, ON L3R 4T5
Tel: 905-940-6161 ext. 373
Fax: 905-940-2064

Geoff Masotti, P.Eng.
Assistant Project Manager
Cole Engineering Group Ltd.
70 Valleywood Drive
Markham, ON L3R 4T5
Tel: 905-940-6161 ext. 254
Fax: 905-940-2064

**Website:** www.VaughanInfrastructure.ca
**Email:** SWMMP@VaughanInfrastructure.ca


**PLEASE CLEARLY PRINT YOUR NAME AND CONTACT INFORMATION BELOW:**
(personal information will not become part of the public record)

| | | | |
|---|---|---|---|
| Name | | Organization | |
| Street | | Telephone | |
| City/Town | | Fax | |
| Postal Code | | Email | |

# APPENDIX C-4
# Notice Of Public Information Centre # 2

# NOTICE OF PUBLIC INFORMATION CENTRE NO. 2

## MASTER PLANS FOR URBAN WATER INFRASTRUCTURE IN VAUGHAN

The City of Vaughan is conducting studies to direct the ongoing development of the City's urban water infrastructure systems that support our communities. These systems include water distribution, wastewater collection and storm water management.

These studies are following the Municipal Servicing Master Plan Class Environmental Assessment (MPCEA) process and will support the City's new Official Plan which was adopted by Council in September 2010. The studies will consider the vision for Vaughan to the year 2031 with sustainability as a key underlying theme.

### MASTER PLAN CLASS ENVIRONMENTAL ASSESSMENT PROCESS

The City has awarded contracts for the following Master Plan studies to be undertaken concurrently:

- City-Wide Storm Drainage / Storm Water Management Master Plan (Cole Engineering Group Limited); and,
- City-Wide Water / Wastewater Master Plan (The Municipal Infrastructure Group Ltd. and Fabian Papa & Partners Inc.).

The MPCEA process includes public and review agency consultation, an assessment of the problem and opportunities (Phase 1), evaluation of alternative solutions, assessment of potential effects on the environment, and identification of reasonable measures to mitigate the adverse effects. The preferred solution(s) will be determined based on engineering requirements, environmental considerations, public input and information gathered during the studies (Phase 2). Subsequent Municipal Class Environmental Assessment work will be required at a later time for the ultimate implementation of the preferred solutions.

### PUBLIC INFORMATION CENTRE DETAILS

A second joint public information centre (PIC) has been scheduled to present the selection of the preferred solutions for water servicing, wastewater servicing, and storm water management. The PIC will provide stakeholders with an opportunity to review and comment on the study information. The PIC has been scheduled for:

| | |
|---|---|
| **Date:** | Wednesday, June 27, 2012 |
| **Time:** | 7:00 p.m. to 9:00 p.m. |
| **Location:** | Vaughan City Hall<br>Multi-Purpose Room, Level 100 |
| **Address:** | 2141 Major Mackenzie Drive, Vaughan, ON L6A 1T1 |

Following the PIC, the material presented at the meeting will be posted on the City of Vaughan's Infrastructure Planning website at **www.VaughanInfrastructure.ca**. For further information, please contact:

Michael Frieri, C.E.T., Manager of Engineering Planning & Studies
Development / Transportation Engineering Department
2141 Major Mackenzie Drive, Vaughan, ON L6A 1T1
Tel: 905-832-8585 Ext. 8729 / Fax: 905-832-6145
E-Mail: Michael.Frieri@VaughanInfrastructure.ca

Please note that information related to these studies will be collected in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments received will become part of the public record and may be included in study documentation prepared for public review. Thank you for your interest in these studies.

**ANDREW PEARCE, Director of Development/ Transportation Engineering, City of Vaughan**
***This Notice issued June 07, 2012***

# APPENDIX C-5
# Public Information Centre # 2

VAUGHAN
Development/Transportation Engineering

# REGISTRATION SHEET

**Public Information Centre #2 – Master Plans for Urban Water Infrastructure in Vaughan**
**Municipal Class Environmental Assessment**

**Wednesday June 27, 2012 – City of Vaughan**

| Name (Please Print) | Address/E-mail | Phone Number |
|---|---|---|
| 1. TONY D'BENEDETTO. | | |
| 2. AL [illegible] | | |
| 3. E. [illegible] | | |
| 4. Aaron Werkhoff | | |
| 5. GERRY LYNCH | | |
| 6. Peter Rueth | | |
| 7. DARLENE SHARE | | |
| 8. SHU HE | | |
| 9. Matt Bell | | |
| 10. VINNIE USSIA | | |

COLE ENGINEERING

fabian papa & partners

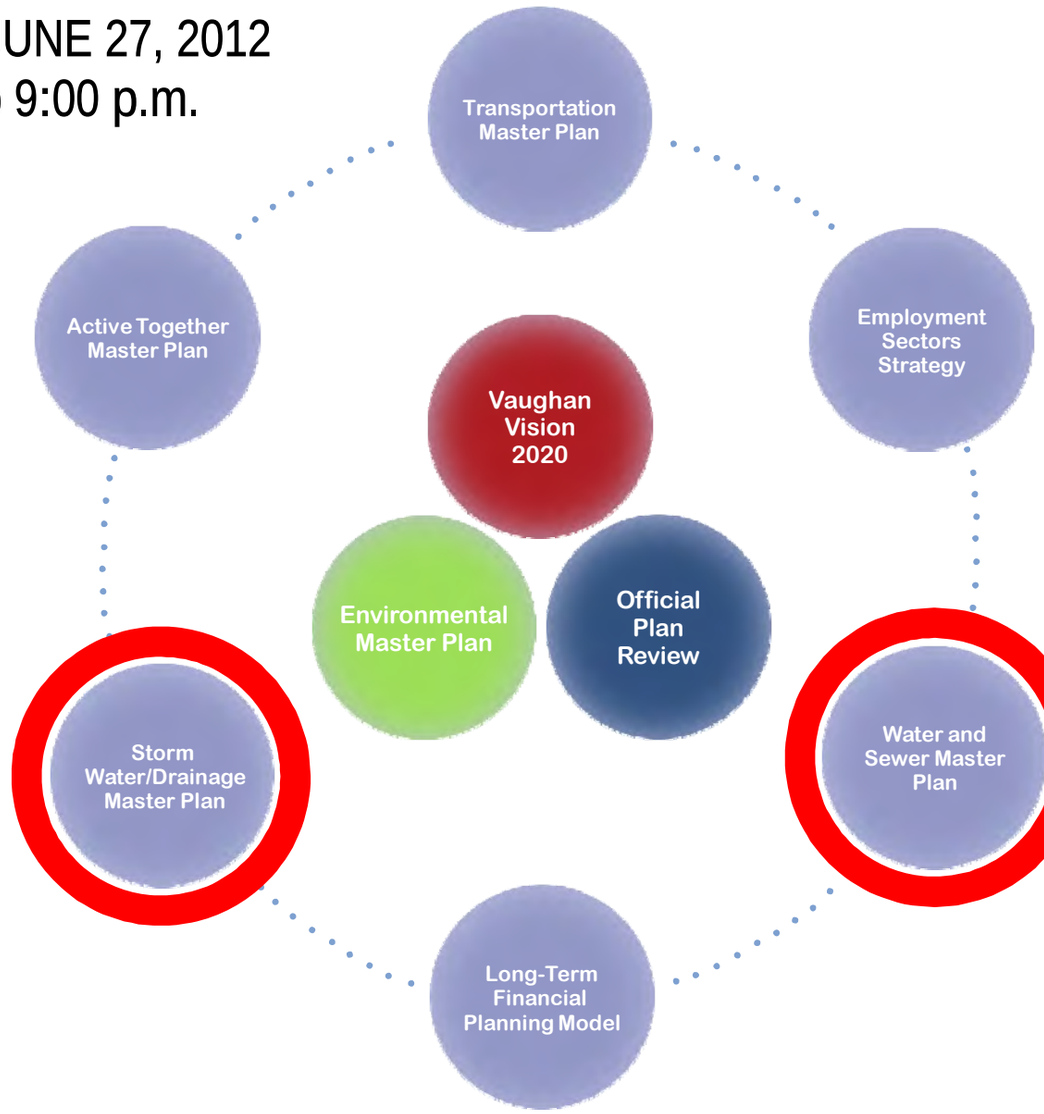
The Municipal Infrastructure Group

# PUBLIC INFORMATION CENTRE No. 2

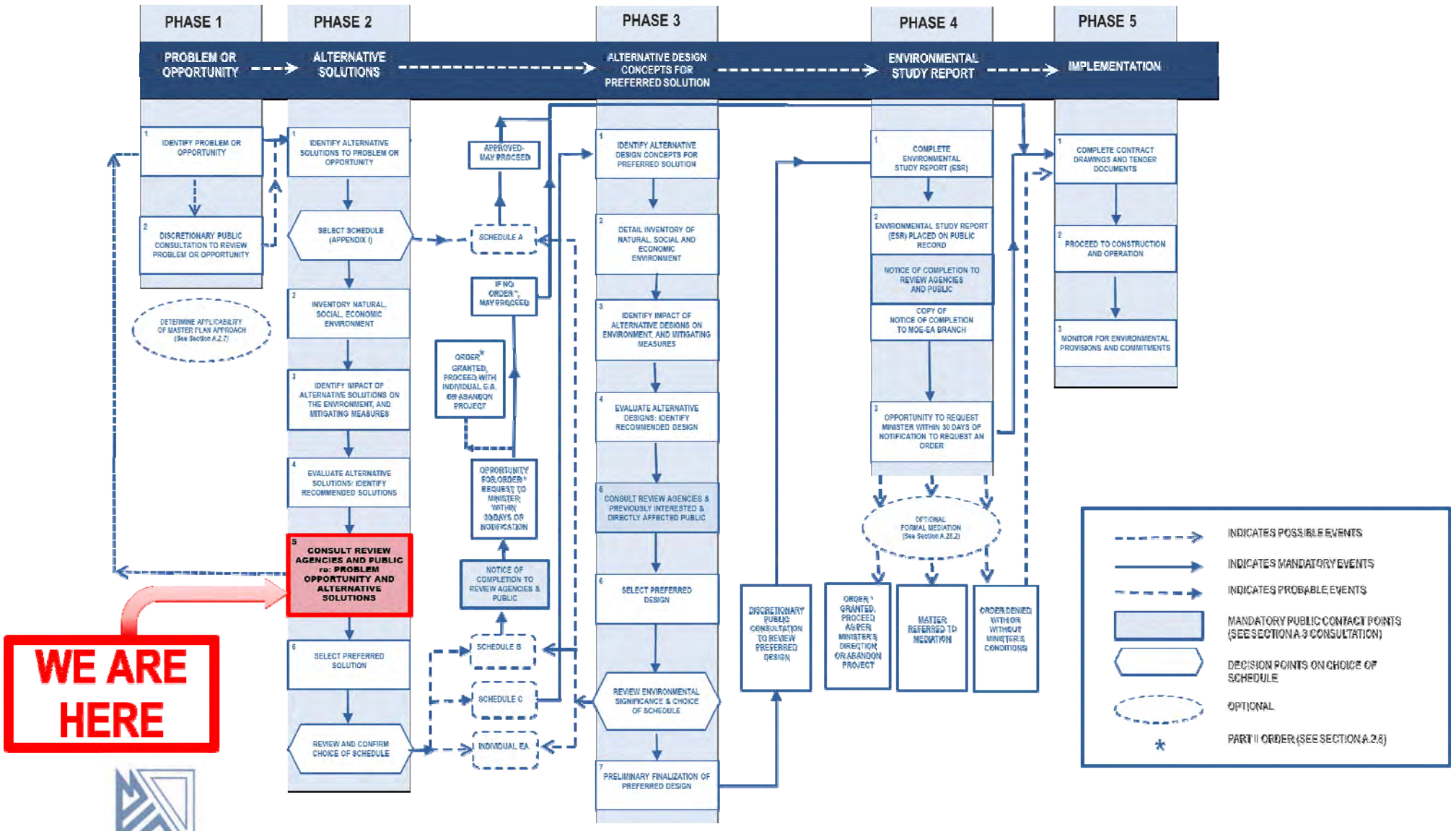
## MASTER PLANS FOR URBAN WATER INFRASTRUCTURE IN VAUGHAN
## Water/Wastewater Master Plan
## Storm Drainage / Storm Water Management Master Plan

### WEDNESDAY JUNE 27, 2012
### 7:00 p.m. to 9:00 p.m.

- Please sign in on the sheet provided. Then feel free to walk around and view the displays.
- The purpose of this Public Information Centre (PIC) is to update you on the status of the projects, inform you of the preliminarily-preferred solutions, and obtain your comments on the project.
- The major elements presented today are:
  - Identification and Evaluation of Alternative Solutions;
  - Identification of the Preliminarily-Preferred Solution;
  - Identification of Specific Infrastructure Strategies and Improvements;
- If you have any questions, our representatives will be pleased to discuss the project with you.
- The Study Teams are interested in receiving any comments that you may have about the Studies.
- Should you have any questions or comments, require further information, or wish to be added to the study mailing lists, please contact one of the Study Team members.



# Class EA Process & Study Team




**WE ARE HERE**

**PROJECT MANAGER**
Michael Frieri
City of Vaughan

**TECHNICAL ADVISORY COMMITTEE**
-York Region
-Toronto and Region Conservation Authority
-Other Vaughan Divisions

**VAUGHAN WATER / WASTEWATER TEAM**
Michael Frieri
Tony Artuso
Robert Mayer

**THE MUNICIPAL INFRASTRUCTURE GROUP FABIAN PAPA & PARTNERS**
Fabian Papa (FP&P)
Eric Tuson (TMIG)
Kevin Brown (TMIG)

**VAUGHAN STORM WATER TEAM**
Saad Yousaf
Carlos Couto
Robert Mayer

**COLE ENGINEERING GROUP**
Edward Graham (Cole)
Geoff Masotti (Cole)
Arun Hindupur (Cole)

## Water/Wastewater Master Plan

Michael Frieri, C.E.T.
Manager of Engineering Planning & Studies
Development/Transportation Engineering Department
City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON L6A 1T1
Tel: 905-832-8585 Ext. 8729
Fax: 905-832-6145

Fabian Papa, M.A.Sc., M.B.A., P.Eng.
Project Manager
Fabian Papa & Partners Inc.
216 Chrislea Road, Suite 801
Woodbridge, ON L4L 8S5
Tel: 905-264-2430 Ext. 419
Fax: 905-264-2441

Eric Tuson, P.Eng.
Assistant Project Manager
The Municipal Infrastructure Group Ltd.
8800 Dufferin Street, Suite 200
Vaughan, ON L4K 0C5
Tel: 905-738-5400 Ext. 239
Fax: 905-738-9085

WWWMP@VaughanInfrastructure.ca

## Storm Drainage / Storm Water Management Master Plan

Saad Yousaf, P.Eng., PMP
Storm Drainage Engineer
Engineering Planning & Studies
City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON L6A 1T1
Tel: 905-832-8585 Ext 8251
Fax: 905-832-6145

Edward Graham, M.A.Sc., P.Eng.
Project Manager
Cole Engineering Group Ltd.
70 Valleywood Drive
Markham, ON L3R 4T5
Tel: 905-940-6161
Fax: 905-940-2064

Geoff Masotti, P.Eng.
Assistant Project Manager
Cole Engineering Group Ltd.
70 Valleywood Drive
Markham, ON L3R 4T5
Tel: 905-940-6161
Fax: 905-940-2064

SWMMP@VaughanInfrastructure.ca

Or, visit the Project Website at
www.VaughanInfrastructure.ca

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# Other Related Studies

Within the City of Vaughan, there are a number of completed and ongoing studies that were reviewed and referenced as part of these Master Plan. A summary of those studies is provided below.

## Vaughan Official Plan

The New Official Plan was completed and adopted by City Council in September 2010, a component of the City's Consolidated Growth Management Strategy to a planning horizon of 2031. The new Official Plan updates the City's community planning policies in a manner consistent with the principles of sustainability.


## Places to Grow

The Provincial 2006 Growth Plan for the Greater Golden Horseshoe forecasts 416,600 people, and 266,100 jobs within the City of Vaughan by 2031. This will be achieved through a combination of expansion to the existing urban boundary and also through intensification within existing built-up areas.

The Places to Grow Act and the Growth Plan provided the basis for the updates to the Official Plan.


## Greenbelt Plan

The Greenbelt Plan was established in 2005 under the Greenbelt Act. The City of Vaughan includes lands that are part of the Greenbelt. The Greenbelt Plan acknowledges the need to maintain existing infrastructure to serve existing land uses and the need for additional infrastructure to support future growth. All new infrastructure that will be within the Greenbelt must comply with specific policies prior to implementation.

## Green Directions Vaughan

Green Directions Vaughan is the City's Community Sustainability and Environmental Master Plan (CSEMP). It influences virtually all aspects of the City's operational and regulatory activities, including the growth management strategy. The plan establishes the principles of sustainability to be used in the development of other plans and master plans to achieve a healthy natural environment, vibrant communities and a strong economy.

## Vaughan Transportation Master Plan

The Transportation Master Plan will define the road and public transit infrastructure, and other initiatives, which are needed to accommodate the population and employment growth that will result from the implementation of the Growth Management strategy.

## Black Creek Optimization Study

The overall goal of the Black Creek Optimization Study is to address the ongoing flooding, water quality and channel erosion issues that have been identified within that Study Area.

## York Water/Wastewater Master Plan

In November 2009, York Region updated their Water and Wastewater Master Plan. As the Region supplies water to the City and collects and treats the City's wastewater, the recommendations of the Water/Wastewater Master Plan need to be compared with those of the Region's Master Plan to ensure consistency.

## Community Sustainability and Environmental Master Plan

Green Directions Vaughan was designed to establish the principles of **sustainability** in Vaughan, and will be considered through these Master Plans to help achieve a healthy natural environment, vibrant communities and a strong economy. Green Directions provides two distinct functions:

1. it creates a series of sustainability action plans to guide the City's operational and regulatory functions; and
2. it acts as the City's first Integrated Community Sustainability Plan.

**There are six key goals outlined in the plan:**

| | | | |
|---|---|---|---|
| **1** | To significantly reduce our use of natural resources and the amount of waste we generate | **4** | To create a vibrant community where citizens, businesses and visitors thrive |
| **2** | To ensure sustainable development and redevelopment | **5** | To be leaders in advocacy and education on sustainability issues |
| **3** | To ensure that Vaughan is a City that is easy to get around with a low environmental impact | **6** | To ensure a supportive system for the implementation of Green Directions |


The **Water/Wastewater Master Plan** and the **Storm Drainage / Storm Water Management Master Plan** will both strive to achieve the goals of Green Directions through:

- ongoing consultation with the Region, TRCA, the Development Community, and the General Public; and,
- consideration of established and emerging technologies to achieve waste reduction and sustainability goals.

# Study Overviews

These Studies are – in part – driven by the Provincially-Mandated Growth Projections (as adopted in the Official Plan):

- City of Vaughan Population is expected to increase from 250,000 (in 2006) to 415,000 by 2031.
- City of Vaughan Employment is expected to increase from 160,000 (in 2006) to 265,000 by 2031.

## Water/Wastewater Master Plan

### OBJECTIVE:

The Water and Wastewater Master Plan will optimize the efficiency of the City's current infrastructure, and identify where and how additional capacity may be provided to address the needs of new development areas, as well as redevelopment and intensification within the built boundary.

The ability of the City's existing water and wastewater distribution/collection systems to service growth will ultimately rely on the capacities of the Region of York's major trunk water and sewer systems.

### PROBLEM/BACKGROUND:

Like many towns and cities throughout Ontario, the City of Vaughan has recently adopted a new City-Wide Official Plan. In Vaughan, the New Official Plan is part of an overall Growth Management Strategy, initiated by Council, that will "shape the future of the City and guide its continued transformation into a vibrant, beautiful and sustainable City".

The New Official Plan was completed and adopted by City Council in September 2010, and as such the City is now interested in undertaking a City-Wide Water/Wastewater Master Plan Environmental Assessment Study (MPEA) to complement the New Official Plan and to establish the water and wastewater infrastructure required to support the build-out of the New Official Plan.

The Water and Wastewater Master Plan will identify alternative infrastructure planning and implementation strategies and select the preferred alternative to meet the City's growth needs, premised upon a time horizon of 2031. Servicing scenarios beyond 2031 will also be considered to efficiently plan for municipal infrastructure requirements in anticipation of full urbanization and build-out of remaining white belt lands throughout the City.

This Water and Wastewater Master Plan is to be co-ordinated and integrated with the Region of York's Water/Wastewater Master Plan Update (2009) as well as the City's principles of sustainability as established in the Community Sustainability and Environmental Master Plan (CSEMP) called Green Directions Vaughan.

### OPPORTUNITY:

This project also presents the opportunity to re-assess the City's design criteria and explore opportunities to maximize the utilization of existing water and wastewater infrastructure.

## Storm Drainage / Storm Water Management Master Plan

### OBJECTIVE:

The Storm Drainage / Storm Water Management Master Plan will evaluate the effectiveness of the existing storm water management infrastructure within the City of Vaughan with an additional focus on the Rainbow Creek Watershed to identify where and how these infrastructure needs may change to address new development areas outside of the current urban boundary, and redevelopment and intensification within the built boundary.

The study will evaluate the use of alternative SWM practices for effective treatment of storm water from source, conveyance, and end of pipe controls to promote protection of the natural environmental systems.

### PROBLEM/BACKGROUND:

In September of 2010 Vaughan Council adopted the new City-Wide Official Plan, a component of the Vaughan Consolidated Growth Management Strategy – 2031. The Official Plan represents an update to the City's community planning policies in a manner consistent with the principles of sustainability. The City is now proceeding with the preparation of a City-Wide Storm Drainage/Storm Water Management (SWM) Master Plan Class Environmental Assessment Study (MPCEA) to complement the new Official Plan and direct the required storm water management infrastructure improvements to support the build-out of the new Official Plan.

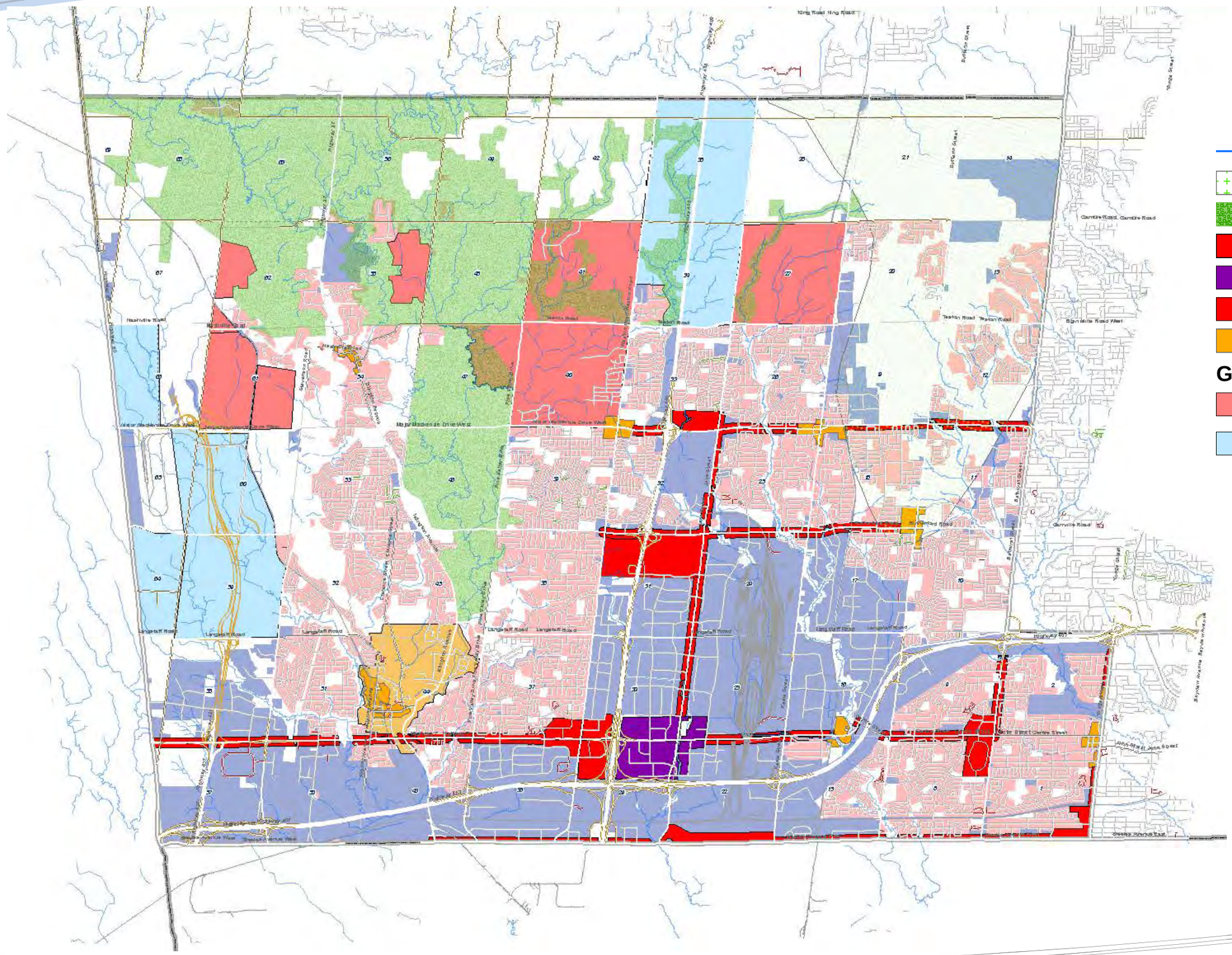
As part of the overall SWM MPCEA, the City is also undertaking an update study to the Rainbow Creek Master Plan. The Toronto and Region Conservation Authority (TRCA) has been working with the City of Vaughan to rehabilitate and enhance the environmental conditions in deteriorated streams in urbanized areas including Rainbow Creek watershed. The City is committed to developing and implementing a regeneration plan for the Rainbow Creek watershed.

### OPPORTUNITY:

This project presents the opportunity to prepare a storm water management planning and guidance document to support and direct development in compliance with the City of Vaughan's Official Plan and policies of the Toronto and Region Conservation Authority to improve and determine the best management practices for storm water management as well as to support future intensification as mandated by the Province of Ontario.

The update to Rainbow Creek Master Plan study presents the opportunity for regeneration that will not only improve the environmental conditions within the creek and valley system but will provide reasonable protection against accelerated erosion rates and flooding while protecting municipal infrastructure and property.

# Official Plan Growth Areas



# Evaluation of Water & Wastewater Alternatives

## EVALUATION CRITERIA

### Technical Merit

- **Functionality** – Ability to meet demands and integrate with existing infrastructure
- **Constructability** – Ease of construction, length of routes, construction methods and crossings

### Natural

- Impact on Natural Environment
  - Need for Greenbelt/ORM crossings or on-Greenbelt/on-ORM construction
  - Impact on terrestrial and aquatic environments

### Socio-Economic

- **Cultural Environmental Impact** – Cultural heritage impact & disruption to surrounding area
- **Transportation Impact** – Impact on traffic patterns, road closures/detours, public transit disruption
- **Residential and Business Impact**
  - Proximity of work to residences, businesses & institutions, public safety and perception
  - Odour & air quality

### Financial

- **25-Year Life Cycle Cost** – Capital, Operations & Maintenance Costs

## WATER & WASTEWATER ALTERNATIVES

### Alternative 1 - Do Nothing

- Proceed with Official Plan Planning recommendations, without any material changes to the City's existing water distribution and wastewater collection infrastructure.

### Alternative 2 – Limit Community Growth

- Limit growth to the extent that can be supported by the existing water and wastewater infrastructure.

### Alternative 3 – Water Conservation (Water & Wastewater) and I/I Reduction (Wastewater)

- Provide for mandated growth without building new infrastructure by reducing water consumption and wastewater generation City-wide as well as reducing infiltration/inflow to the existing sanitary sewer system.

### Alternative 4 – Build New Water/Wastewater Systems

- Provide for mandated growth by building new water source/supply and wastewater collection/disposal systems (i.e., independent of the existing systems).

### Alternative 5 – Expand & Enhance Existing Water and Wastewater Infrastructure

- Provide for mandated growth through a combination of enhancements of the existing system or extension of the existing system into new growth areas.

## Water Alternatives Evaluation

◇ Lowest Score → ◆ Highest Score *Preferred*

| Evaluation Criteria | Alternative 1 Do Nothing | Alternative 2 Limit Community Growth | Alternative 3 Water Conservation | Alternative 4 Build New Water Systems | Alternative 5 Expand & Enhance Existing Water Distribution System |
|---|---|---|---|---|---|
| Technical Merit | This option does not address the needs of the growth envisioned for Vaughan via intensification or expansions to urban boundaries, nor does it address any current concerns or the realities of an ageing infrastructure system. | Falls short of providing infrastructure necessary to satisfy objectives of the City's Official Plan. | Helpful at increasing utilization of existing infrastructure but does not allow for expansion of the urban boundary as identified in Official Plan. | Significant works required which will not benefit from economies of scale or leverage available Regional level infrastructure currently in place and planned. | Completely addresses the growth envisioned in the Official Plan through intensification and expansions to urban boundaries in addition to improving and increasing utilization of the City's existing stock of infrastructure. |
| Natural | Impacts from private water wells. | No impact, but does not offer improvements to existing conditions. | No impact and offers improvements to existing conditions. | Will result in development of local water supplies and abstraction thereof from the natural environment in addition to related energy requirements. | Some impact as a result of construction works including creek crossings. Most construction will occur in road right-of-ways and the use of trenchless technologies will largely mitigate concerns. Offers valuable improvements to existing conditions. |
| Socio-Economic | This option severely limits economic development through population or business growth. | This option does not meet the growth and density objectives of the City's Official Plan. | Although this option does offer value to the existing developed areas, it does not meet the urban expansion objectives of the Official Plan. | Significant construction works will be required for this with resultant disruptions, inconsistency with municipal service delivery model used in City and Region. | Modest impacts during construction, most of which will occur in existing areas via new/re-existing development. Completely satisfies City's Official Plan growth objectives. |
| Financial | No impact. | Modest financial investment required. | Modest financial investment required. | Very large financial investment required. | Reasonable financial investment required. |
| Overall | Cannot satisfy City's Servicing Policies, as documented in the Official Plan. NOT RATED | Cannot satisfy Provincially-mandated growth targets. NOT RATED | Cannot satisfy Provincially-mandated growth targets. NOT RATED | This option is inferior to the other viable alternatives for all evaluation criteria. ◇ | Optimal balance of benefits and impacts across all evaluation criteria while fully satisfying City's Official Plan growth objectives. ◆ |

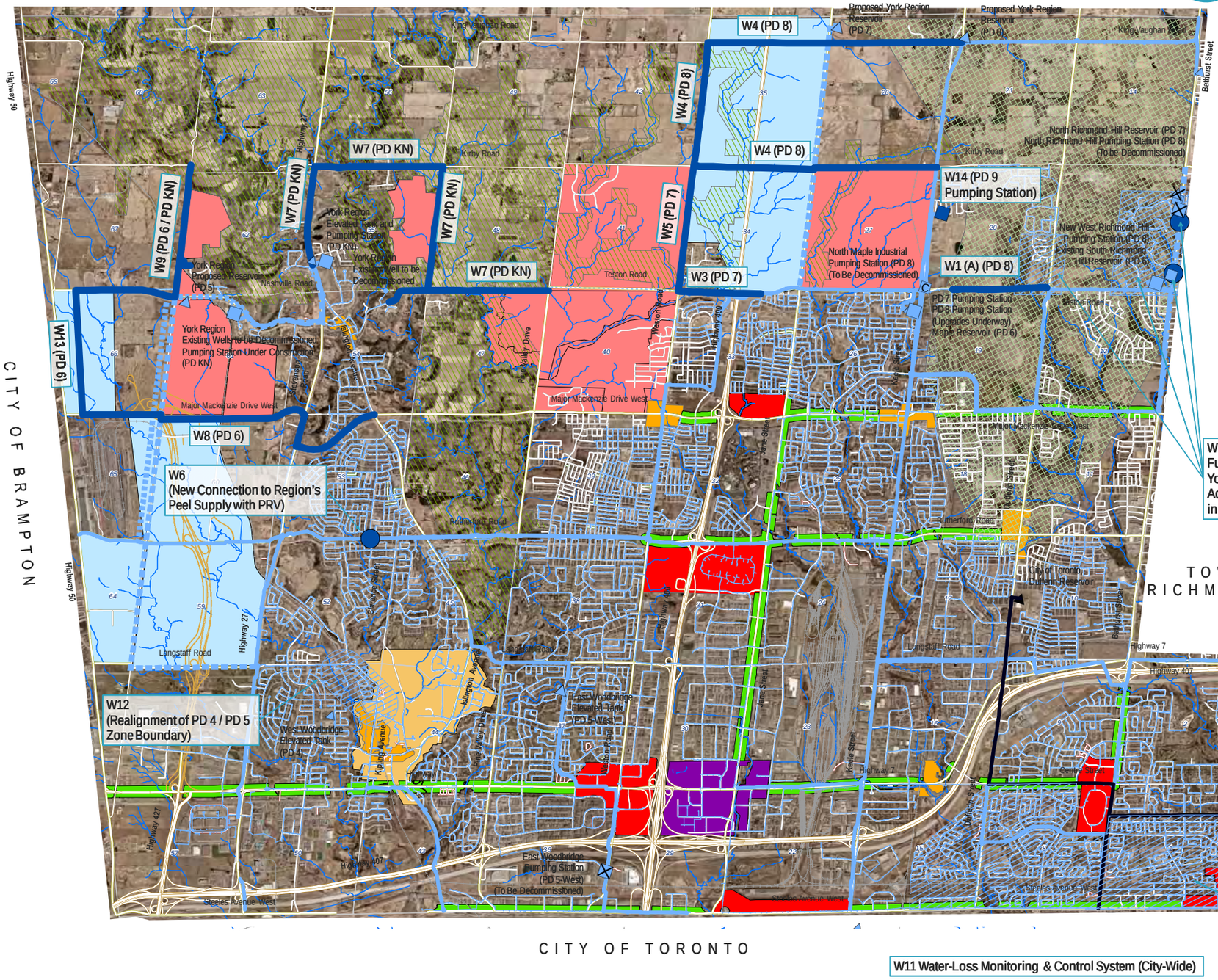
## Wastewater Alternatives Evaluation

◇ Lowest Score → ◆ Highest Score *Preferred*

| Evaluation Criteria | Alternative 1 Do Nothing | Alternative 2 Limit Community Growth | Alternative 3 Water Conservation | Alternative 4 Build New Wastewater Systems | Alternative 5 Expand & Enhance Existing Collection System |
|---|---|---|---|---|---|
| Technical Merit | This option does not address the needs of the growth envisioned for Vaughan via intensification or expansions to urban boundaries, nor does it address any current concerns or the realities of an ageing infrastructure system. | Falls short of providing infrastructure necessary to satisfy objectives of the City's Official Plan. | Helpful at increasing utilization of existing infrastructure but does not allow for expansion of the urban boundary as identified in Official Plan. | Significant works required which will not benefit from economies of scale or leverage available Regional level infrastructure currently in place and planned. | Completely addresses the growth envisioned in the Official Plan through intensification and expansions to urban boundaries in addition to improving and increasing utilization of the City's existing stock of infrastructure. |
| Natural | Impacts from private septic systems. | No impact, but does not offer improvements to existing conditions. | No impact and offers improvements to existing conditions. | Will result in development of local sanitary collection systems and treatment plants, increasing pollutant loadings to natural watercourses and increased energy requirements. | Some impact as a result of construction works including creek crossings. Most construction will occur in road right-of-ways and the use of trenchless technologies will largely mitigate concerns. Offers valuable improvements to existing conditions. |
| Socio-Economic | This option severely limits economic development through population or business growth. | This option does not meet the growth and density objectives of the City's Official Plan. | Although this option does offer value to the existing developed areas, it does not meet the urban expansion objectives of the Official Plan. | Significant construction works will be required for this with resultant disruptions, inconsistency with municipal service delivery model used in City and Region. | Modest impacts during construction, most of which will occur in existing areas via new/re-existing development. Completely satisfies City's Official Plan growth objectives. |
| Financial | No impact. | Modest financial investment required. | Modest financial investment required. | Very large financial investment required. | Reasonable financial investment required. |
| Overall | Cannot satisfy City's Servicing Policies, as documented in the Official Plan. NOT RATED | Cannot satisfy Provincially-mandated growth targets. NOT RATED | Cannot satisfy Provincially-mandated growth targets. NOT RATED | This option is inferior to the other viable alternatives for all evaluation criteria. ◇ | Optimal balance of benefits and impacts across all evaluation criteria while fully satisfying City's Official Plan growth objectives. ◆ |

MASTER PLANS FOR URBAN WATER INFRASTRUCTURE IN VAUGHAN
PUBLIC INFORMATION CENTRE #2 June 27, 2012

# Water Servicing Preferred Alternative




| ID | Description | Trigger | Class EA Schedule | Estimated Cost (2012 dollars) |
|---|---|---|---|---|
| W1(A) | Option A:<br>Teston Road PD8 Watermain | Subject to ongoing monitoring of pressures and construction of Teston Road connection | A+ | $2,800,000 |
| W1(B) | Option B:<br>PD8 East Improvements | Connections to Region infrastructure: When available<br>Fire protection study: 2013<br>Fire protection improvements: TBD | A+ | $ 1,400,000<br>(not carried in total) |
| W3 | Teston Road PD7 Watermain Twinning | Block 55 Development | A+ | $ 5,600,000 |
| W4 | Block 35 PD8 Watermain | Block 34E/35 Development | A+ | $ 26,600,000 |
| W5 | Weston Road PD7 Watermain | Block 34W/41 Development | A+ | $ 2,800,000 |
| W6 | Forest Fountain Drive PD6 Watermain Connection | Subject to ongoing monitoring of pressures | A+ | $ 400,000 |
| W7 | Block 55 PD-KN Watermains | Block 55 Development | A+ | $ 12,200,000 |
| W8 | Major Mackenzie Drive PD6 Watermain | Block 60/61 Development | A+ | $ 7,200,000 |
| W9 | Huntington Road Watermain | Block 62W Development | A+ | $ 3,200,000 |
| W10 | PD5-East Improvements | Subject to further study and ongoing monitoring of pressures | TBD | $ 1,700,000 |
| W11 | Water Loss Monitoring & Control System | Progressive development during 2012-2017 | A | $ 2,800,000 |
| W12 | Realignment of PD4/PD5 Zone Boundary on Kipling Avenue | Subject to ongoing monitoring of pressures | A | $ 100,000 |
| W13 | Block 66W PD6 Watermain | Block 66W Development | A+ | $7,900,000 |
| W14 | PD9 Pumping Station | Subject to Condition Assessment of Existing City Pumping Station | B | $ 3,400,000 |
| | **TOTAL WATER** | | | $ 76,700,000<br>(~ $ 1050/residential unit) |

**Legend**

- Proposed Master Plan Pumping Station
- Proposed Master Plan Watermain
- City of Vaughan Pumping Station
- City of Vaughan Existing Watermain
- City of Vaughan Proposed Watermain
- York Region Pumping Station
- York Region Storage Facility
- York Region Pumping Station to be Decommissioned
- York Region Storage Facility to be Decommissioned
- York Region Existing Watermain
- York Region Watermain Under Construction
- York Region Watermain to be Constructed by 2031
- City of Toronto Reservoir
- City of Toronto Watermain
- Freeway
- Interchange
- Regional Road
- Arterial Road
- Rural Road
- Railway
- Rivers
- Oak Ridges Moraine
- Green Belt
- Urban Boundary
- Primary Intensification Corridors
- Primary Centres
- Vaughan Metropolitan Centre
- Local Corridors
- Employment Growth Areas
- Residential Growth Areas
- Woodbridge Core

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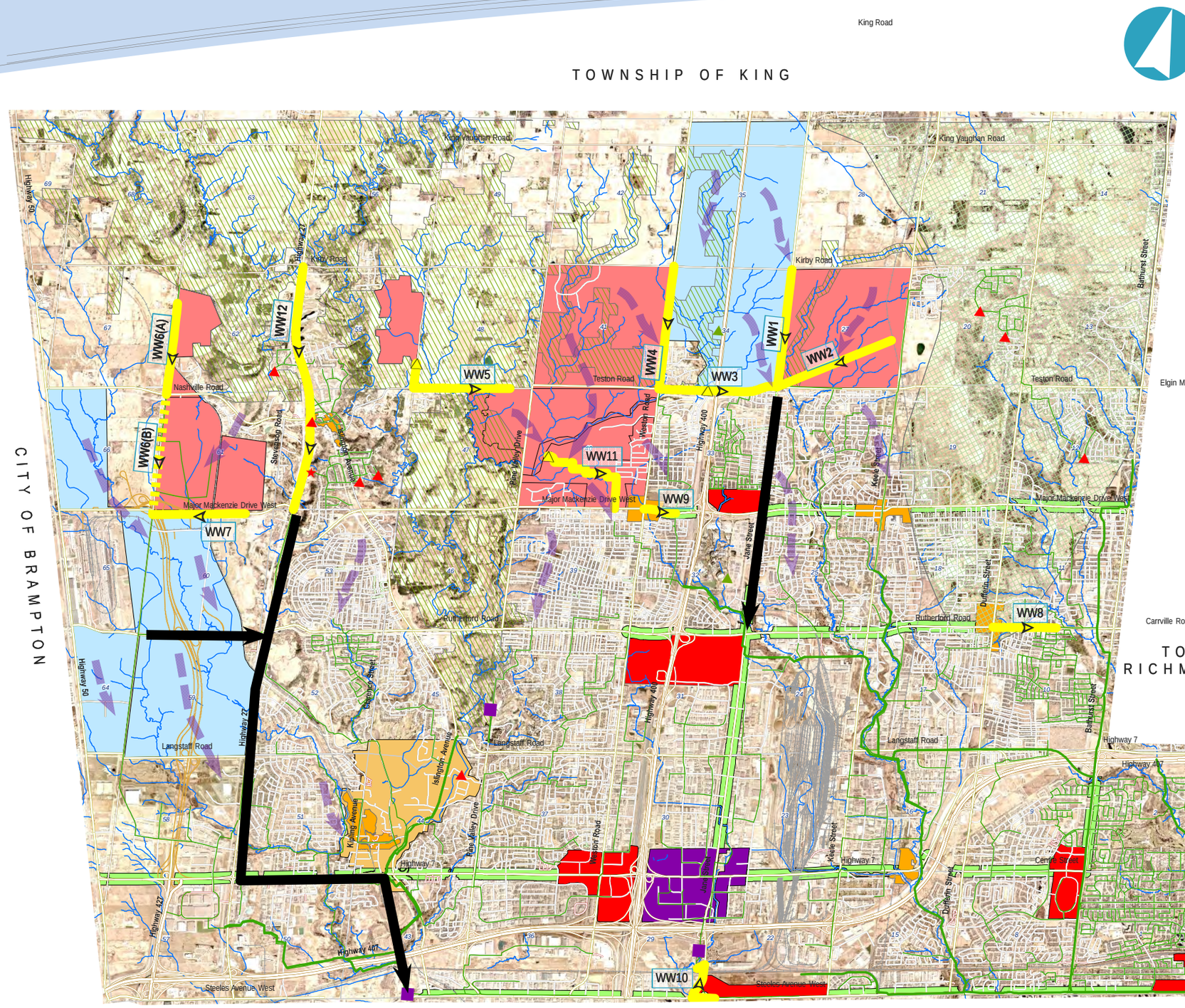
# Sanitary Servicing Preferred Alternative




| ID | Description | Trigger | Class EA Schedule | Estimated Cost (2012 dollars) |
|---|---|---|---|---|
| WW1 | Jane Street Sub-Trunk Sanitary Sewer | Block 35E Development | A+ | $ 2,600,000 |
| WW2 | Block 27 Sub-Trunk Sanitary Sewer | Block 27 Development | A+ | $ 1,700,000 |
| WW3 | Teston Sub-Trunk Sanitary Sewer and SPS | Block 34/35W/41 Development | A+ | $ 10,000,000 |
| WW4 | Weston Sub-Trunk Sanitary Sewer | Block 34W/41 Development | A+ | $ 2,800,000 |
| WW5 | Block 55 SPS/Forcemain | Block 55 Development | B | $ 5,300,000 |
| WW6 | Huntington Road Sub-Trunk Sanitary Sewer | Block 62W Development | A+ | $ 2,100,000 |
| WW7 | Major Mackenzie Drive Sub-Trunk Sanitary Sewer | Block 61 Development | A+ | $ 2,600,000 |
| WW8 | Carrville Centre Sewer (Rutherford Road) | Carrville Centre Development | A+ | $ 1,300,000 |
| WW9 | Vellore Centre Sewer (Major Mackenzie Drive) | Block 55/41W Development | A+ | $ 700,000 |
| WW10 | South Jane Street Sanitary Sewer Upgrades | Steeles West Development | A+ | $ 2,200,000 |
| WW11 | Pine Valley North SPS/Forcemain | Block 40/47/55 Development | MESP | $ 22,000,000 |
| WW12 | Highway 27 (Kleinburg) Sanitary Sewer | Further Development in North Kleinburg | A+ | $ 4,100,000 |
| | **TOTAL WASTEWATER** | | | **$ 57,400,000** (~ $ 800/residential unit) |

**Legend**

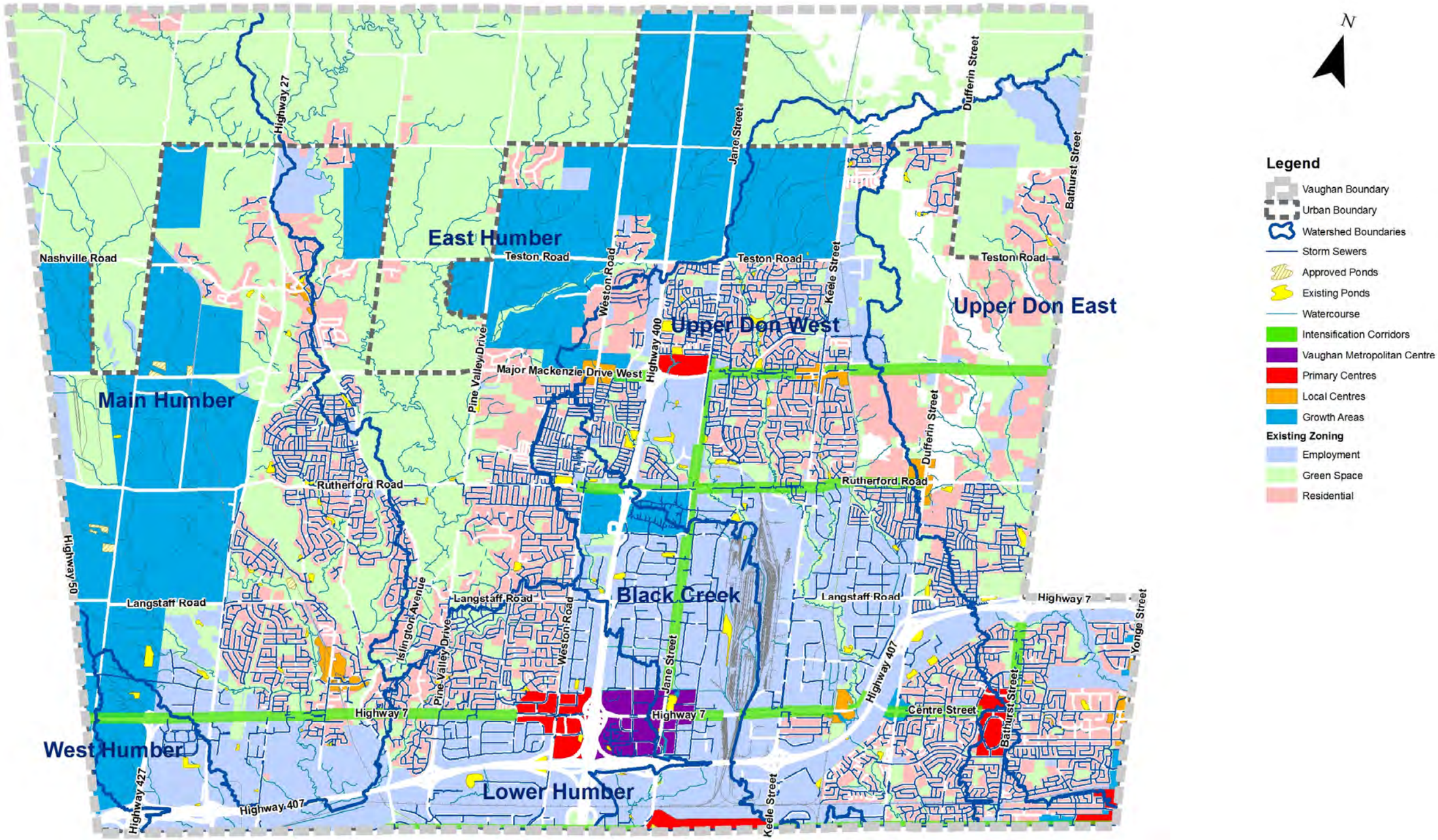
- City of Vaughan Existing Sanitary Sewer
- City of Vaughan Proposed Sanitary Sewer
- Private Pumping Station
- City of Vaughan Existing Pumping Station
- City of Vaughan Proposed Pumping Station
- York Region Existing Pumping Station
- York Region Water Pollution Treatment Plant
- York Region Existing Sanitary Sewer
- Proposed York Region Sanitary Sewer Projects
- Freeway
- Interchange
- Regional Road
- Arterial Road
- Rural Road
- Railway
- Rivers
- Oak Ridges Moraine
- Green Belt
- Urban Boundary
- Primary Intensification Corridors
- Primary Centres
- Vaughan Metropolitan Centre
- Local Corridors
- Employment Growth Areas
- Residential Growth Areas
- Woodbridge Core

# Growth Area Servicing Requirements

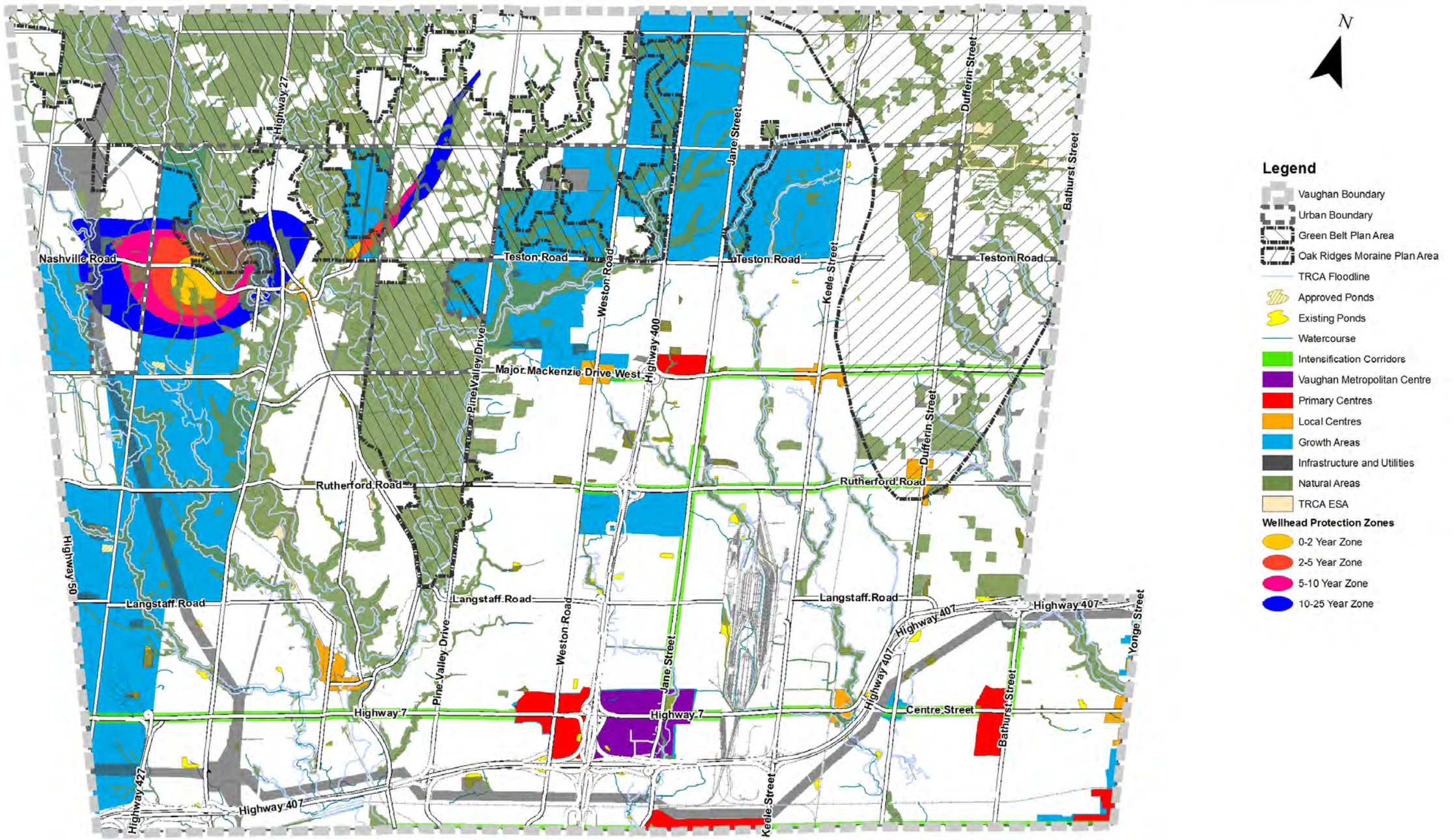
| | Growth Area | Water Servicing | Wastewater Servicing |
|---|---|---|---|
| | Infill within Existing Areas | Existing Servicing | Existing Servicing |
| | Vaughan Metropolitan Centre | Existing Servicing | Existing Servicing |
| Intensification; Major Centres | Yonge and Steeles | Existing Servicing<br>W10 – PD5-East Improvements<br>(Subject to ongoing monitoring) | Existing Servicing |
| | Steeles West | Existing Servicing | WW10 – South Jane Street |
| | Weston and Highway 7 | Existing Servicing | Existing Servicing |
| | Bathurst Street and Centre Street | Existing Servicing | Existing Servicing |
| | Vaughan Mills | Existing Servicing | Existing Servicing |
| | Jane and Major Mackenzie | Existing Servicing | Existing Servicing |
| Intensification; Local Centres | Kleinburg Core | Existing Servicing | Existing Servicing |
| | Woodbridge Core | Existing Servicing<br>W12 – Realignment of PD4/PD5 Zone Boundary on Kipling Avenue<br>(Subject to ongoing monitoring) | Existing Servicing |
| | Maple Core | Existing Servicing | Existing Servicing |
| | Thornhill Core | Existing Servicing | Existing Servicing |
| | Carrville Centre | Existing Servicing | WW8 – Carrville Centre Sewer |
| | Concord GO Station | Existing Servicing | Existing Servicing |
| | Vellore Village Core | Existing Servicing | WW9 – Vellore Centre Sewer |
| Intensification; Corridors | Highway 7 | Existing Servicing | Existing Servicing |
| | Centre Street | Existing Servicing<br>W10 – PD5-East Improvements<br>(Subject to ongoing monitoring) | Existing Servicing |
| | Dufferin and Centre | Existing Servicing<br>W10 – PD5-East Improvements<br>(Subject to ongoing monitoring) | Existing Servicing |
| | Major Mackenzie Drive | Existing Servicing | Existing Servicing |
| | Rutherford Road | Existing Servicing | Existing Servicing |
| | Jane Street | Existing Servicing | Existing Servicing |

| | Growth Area | Water Servicing | Wastewater Servicing |
|---|---|---|---|
| Greenfield | Block 20 | Existing Servicing<br>W14 – PD9 Servicing<br>(Subject to Condition Assessment) | Existing Servicing |
| | Block 27 | Existing Servicing | WW2 – Block 27 Sub-Trunk<br>*REG-WW02 – North East Vaughan Trunk* |
| | Block 33W | Existing Servicing | Existing Servicing |
| | Block 34E (Highway 400 North Employment Lands) | W5 – Weston Road PD7 Watermain | WW3 – Teston Sub-Trunk<br>*REG-WW02 – North East Vaughan Trunk* |
| | Block 34W (Highway 400 North Employment Lands) | W4 – Block 35 PD8 Watermain<br>*Only Portion along Kirby Road from Keele Street to West of Jane Street* | WW3 – Teston Sub-Trunk<br>*REG-WW02 – North East Vaughan Trunk* |
| | Block 35E (Highway 400 North Employment Lands) | W4 – Block 35 PD8 Watermain | WW1 – Jane Sub-Trunk<br>*REG-WW02 – North East Vaughan Trunk* |
| | Block 35W (Highway 400 North Employment Lands) | W4 – Block 35 PD8 Watermain | WW3 – Teston Sub-Trunk<br>WW4 – Weston Sub-Trunk<br>*REG-WW02 – North East Vaughan Trunk* |
| | Blocks 40/47 | Existing Services | WW11 – Pine Valley North SPS/Forcemain |
| | Block 41 | W5 – Weston Road PD7 Watermain | WW3 – Teston Sub-Trunk*<br>WW4 – Weston Sub-Trunk*<br>**Subject to timing of development of Vellore Village Core*<br>*REG-WW02 – North East Vaughan Trunk* |
| | Block 55 | W3 – Teston Road PD7 Watermain<br>W7 – Block 55 PD-KN Watermain Servicing | WW5 – Block 55 SPS/Forcemain<br>WW11 – Pine Valley North SPS/Forcemain |
| | Block 59 (West Vaughan Employment Area) | Existing Servicing | Existing Servicing |
| | Block 60 (West Vaughan Employment Area) | Block 59 Internal Servicing<br>W8 – Major Mackenzie Drive PD6 Watermain | *REG-WW01 – West Vaughan Trunk* |
| | Block 61 | W8 – Major Mackenzie Drive PD6 Watermain | WW7 – Major Mackenzie Sub-Trunk |
| | Block 62W | W9 – Huntington Road Watermain | WW6 – Huntington Sub-Trunk |
| | Block 64 | Existing Servicing | Existing Servicing |
| | Block 66W (West Vaughan Employment Area) | W13 – Block 66 West PD6 Watermain | *REG-WW01 – West Vaughan Trunk* |
| | North Kleinburg | Existing Servicing | WW12 – Hwy 27 (Kleinburg) Sewer |

# Existing Storm Water Management Infrastructure



# Natural Hazard Areas and Constraints



# Alternatives Evaluation

| | Yonge Steeles | | | Woodbridge Core | | | West Vaughan Employment Area | | | Kleinburg-Nashville | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Evaluation Criteria** | **Alternative 1: Do Nothing** | **Alternative 2: At Source / Conveyance Controls** | **Alternative 3: End of Pipe Controls** | **Alternative 1: Do Nothing** | **Alternative 2: At Source / Conveyance Controls** | **Alternative 3: End of Pipe Controls** | **Alternative 1: Do Nothing** | **Alternative 2: At Source / Conveyance Controls** | **Alternative 3: End of Pipe Controls** | **Alternative 1: Do Nothing** | **Alternative 2: At Source / Conveyance Controls** | **Alternative 3: End of Pipe Controls** |
| **Technical Merit** | ◑ | ● | ● | ○ | ● | ● | ○ | ● | ● | ○ | ● | ● |
| **Natural** | ◑ | ● | ● | ○ | ● | ● | ○ | ● | ● | ○ | ● | ● |
| **Social / Cultural Environment** | ◑ | ● | ◑ | ○ | ● | ◑ | ○ | ● | ● | ○ | ● | ● |
| **Financial** | ● | ◑ | ◑ | ◑ | ◑ | ◑ | ● | ◑ | ◑ | ● | ◑ | ◑ |
| **Overall Preferred Alternative** | ○ | ● | ○ | ○ | ● | ○ | ○ | ● | ● | ○ | ● | ● |

○ Least Preferred ◑ ● Most Preferred

Alternative 1: Do Nothing
This alternative does not require any action with regards to the implementation of stormwater management for a proposed development. The "Do Nothing" alternative must be considered as part of the Class EA as a way of establishing baseline conditions

Alternative 2: At Source / Conveyance / Lot Level Controls
This alternative involves the implementation of various "small scale" controls for water quantity, water quality, water balance and erosion control. These may include but are not limited to surface storage, roof top storage, parking lot storage, underground storage, cisterns, green roofs, infiltration trenches, rain gardens, swales, filter strips, permeable pavement and Oil / Grit Separator (OGS) units. Not all technologies/methods may be feasible in all areas.

Alternative 3: End of Pipe Controls
This alternative involves the implementation of stormwater management ponds or other end of pipe methods for water quantity, water quality, and erosion control.

# Preferred SWM Alternative

## Woodbridge Core Intensification Area

**Preferred Stormwater Management Alternative**


| Control | Criteria | SWM Strategy |
|---|---|---|
| Quantity | Post development peak flows to be controlled to existing 5 year peak flows for all events up to the 100 year design storm. Convey all runoff to existing storm sewers in existing right-of-ways. | -Rooftop Storage<br>-Surface Ponding<br>-Underground Storage |
| Quality | Quality - Enhanced Level I - 80% TSS Removal. | -OGS Units |
| Erosion | 5 mm on-site retention for all storm events. | -Green Roofs<br>-Roof Leader to Pervious Depressions<br>-Infiltration Trenches<br>-Rain Gardens<br>-Permeable Pavements |
| Water Balance | Best efforts to maintain existing infiltration rates. | |

## Legend

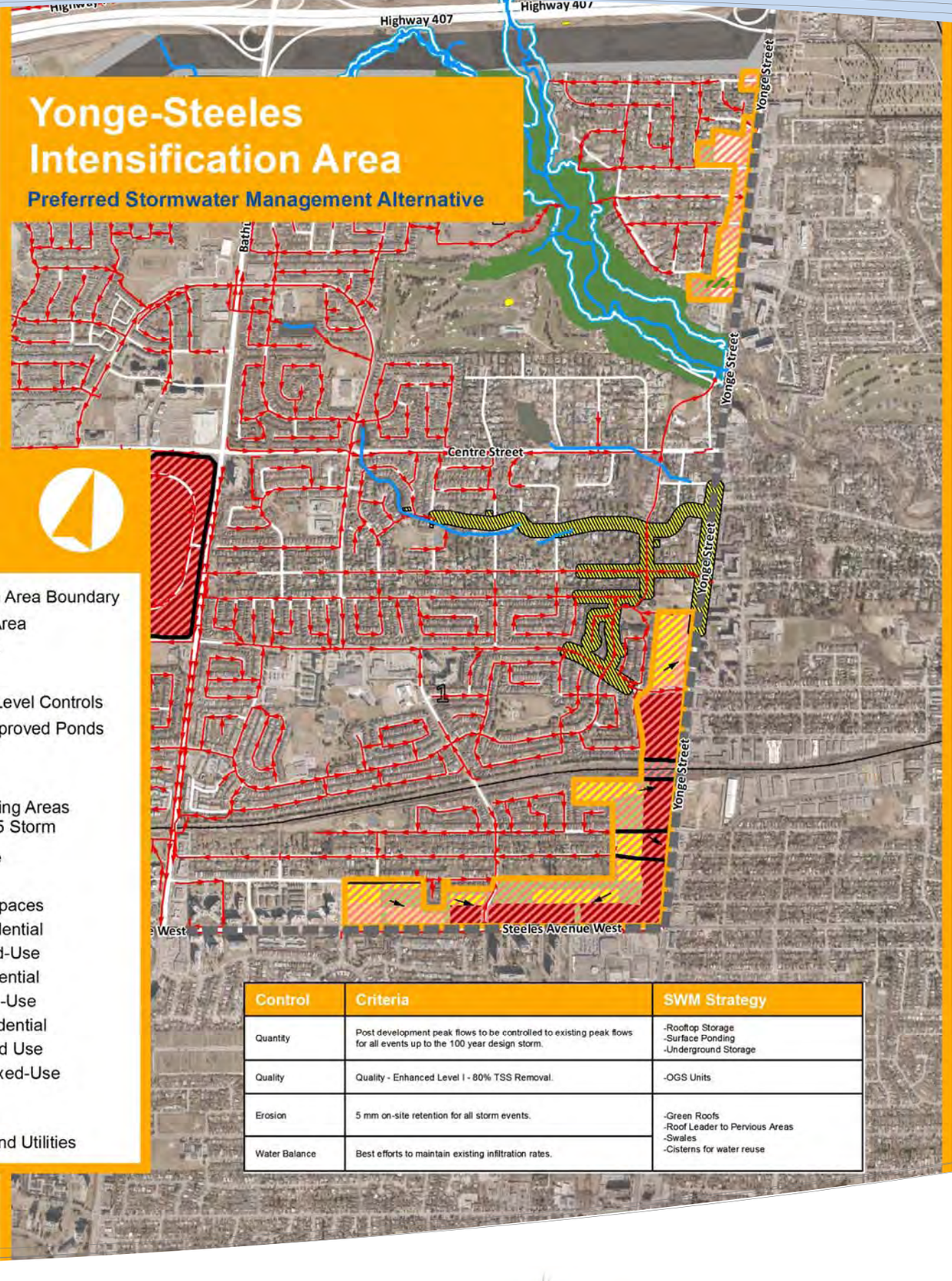
- Secondary Plan Area Boundary
- Special Policy Area
- TRCA Floodline
- Drainage Area
- Areas with Lot Level Controls
- Existing and Approved Ponds
- Watercourse
- Storm Sewers
- Reported Flooding Areas August 19, 2005 Storm

Proposed Land Use

- Parks
- Private Open Spaces
- Low-Rise Residential
- Low-Rise Mixed-Use
- Mid-Rise Residential
- Mid-Rise Mixed-Use
- High-Rise Residential
- High-Rise Mixed Use
- Commercial Mixed-Use
- Schools
- Natural Areas
- Infrastructure and Utilities

## Yonge-Steeles Intensification Area

**Preferred Stormwater Management Alternative**




| Control | Criteria | SWM Strategy |
|---|---|---|
| Quantity | Post development peak flows to be controlled to existing peak flows for all events up to the 100 year design storm. | -Rooftop Storage<br>-Surface Ponding<br>-Underground Storage |
| Quality | Quality - Enhanced Level I - 80% TSS Removal. | -OGS Units |
| Erosion | 5 mm on-site retention for all storm events. | -Green Roofs<br>-Roof Leader to Pervious Areas<br>-Swales<br>-Cisterns for water reuse |
| Water Balance | Best efforts to maintain existing infiltration rates. | |

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# Preferred SWM Alternative

## West Vaughan Employment Area

**Preferred Stormwater Management Alternative**

## Kleinburg-Nashville New Community Areas

**Preferred Stormwater Management Alternative**

Potential quality control SWM facility location.

Potential SWM Pond retrofit opportunity, pending capacity analysis of conveyance infrastructure.

### Legend

- Secondary Plan Area Boundary
- Highway 427 Planned Extension
- MTO Approval Corridor
- Special Study Area
- Rainbow Creek Subwatershed Boundary
- TRCA Floodline
- Divert flows to Rainbow Creek
- Drainage Area
- Areas Draining to Ponds
- Areas with Lot Level Controls
- Existing and Approved SWM Ponds
- Proposed SWM Ponds
- Watercourse
- Existing Storm Sewers

Proposed Land Use

- Agriculture
- Low-Rise Residential
- Low-Rise Mixed-Use
- General Employment
- Prestige Employment
- Schools
- Natural Areas
- Infrastructure and Utilities

| Control | Criteria | SWM Strategy |
|---|---|---|
| Quantity | Post Development Peak flows to be controlled to the Unit Flow Rate targets for Humber River Sub-basin 36. | -SWM Ponds<br>-Rooftop Storage (restricted)<br>-Surface Ponding |
| Quality | Quality - Enhanced Level I - 80% TSS Removal. | -SWM Ponds |
| Erosion | 5 mm on-site retention for all storm events. | -Green Roofs<br>-Roof Leader to Pervious Areas<br>-Swales<br>-Cisterns for water reuse |
| Water Balance | Best efforts to maintain existing infiltration rates. | |

| Control | Criteria | SWM Strategy |
|---|---|---|
| Quantity | Where required, post development peak flows to be controlled to the Unit Flow Rate targets for Humber River Sub-basins 36 and 19A. Areas discharging directly to the Main and East Humber River do not require any quantity control. | -SWM Ponds<br>-Rooftop Storage<br>-Surface Ponding |
| Quality | Quality - Enhanced Level I - 80% TSS Removal. | -SWM Ponds<br>-OGS Units (where applicable) |
| Erosion | Ponds to provide minimum of 24-hour drawdown for runoff from the 25 mm storm event. Sites with lot level controls and all sites discharging to Rainbow Creek are to provide on-site retention for the first 5 mm for all storm events. | -Green Roofs<br>-Directing Roof Leader to Pervious Areas<br>-Swales<br>-Infiltration Trenches<br>-Rain Gardens<br>-Permeable Pavement |
| Water Balance | Best efforts to maintain existing infiltration rates. | |

# Approved and Future Secondary Plan Areas

## Preferred Stormwater Management Alternatives

○ Least Preferred ● Most Preferred

| Approved Secondary Plan Areas | Lot Level Controls | End of Pipe Controls |
|---|---|---|
| Steeles West (Recommendations per OPA 620 Municipal Servicing Master Plan Class EA) | ● Control runoff on-site using rooftop and surface storage prior to discharge to SWM Ponds | ● Retrofit existing and construct additional SWM Ponds |
| Highway 400 North Employment Lands | ● Control runoff on-site using rooftop and surface storage prior to discharge to SWM Ponds | ● New Proposed SWM Ponds |
| Carrville Centre (OPA 651) | ● Rooftop and surface storage | ● New Proposed SWM Ponds |
| Kipling Avenue | ● Rooftop and surface storage, underground storage if necessary | ○ |

| Future Secondary Plan Areas | Lot Level Controls | End of Pipe Controls |
|---|---|---|
| Vaughan Mills Centre | ● Rooftop and surface storage | ● New SWM Pond for lands west of Hwy 400. Utilize existing SWM Ponds for lands east of Hwy 400. |
| Weston Road and Highway 7 | ● Rooftop and surface storage | ● Existing SWM Ponds |
| Concord Centre | ● Rooftop and surface storage | ○ |
| New Community Areas (Blocks 41 & 27) | ○ | ● New Proposed SWM Ponds |
| Jane Street and Major Mackenzie Drive (Vaughan Health Campus of Care) | ○ | ● New Proposed SWM Ponds |
| Dufferin Street and Centre Street | ● Rooftop and surface storage | ● Proposed SWM Pond (pending SPA decision) |
| Promenade Mall | ● Rooftop and surface storage | ○ |

## Legend

- Secondary Plan Areas
- Future Secondary Plan Areas
- Green Belt Plan Area
- Oak Ridges Moraine Plan Area
- Special Policy Area
- TRCA Floodline
- Drainage Area
- Areas Draining to Ponds
- Areas with Lot Level Controls
- Existing and Approved SWM Ponds
- Proposed SWM Ponds
- Watercourse
- Storm Sewers

Proposed Land Use

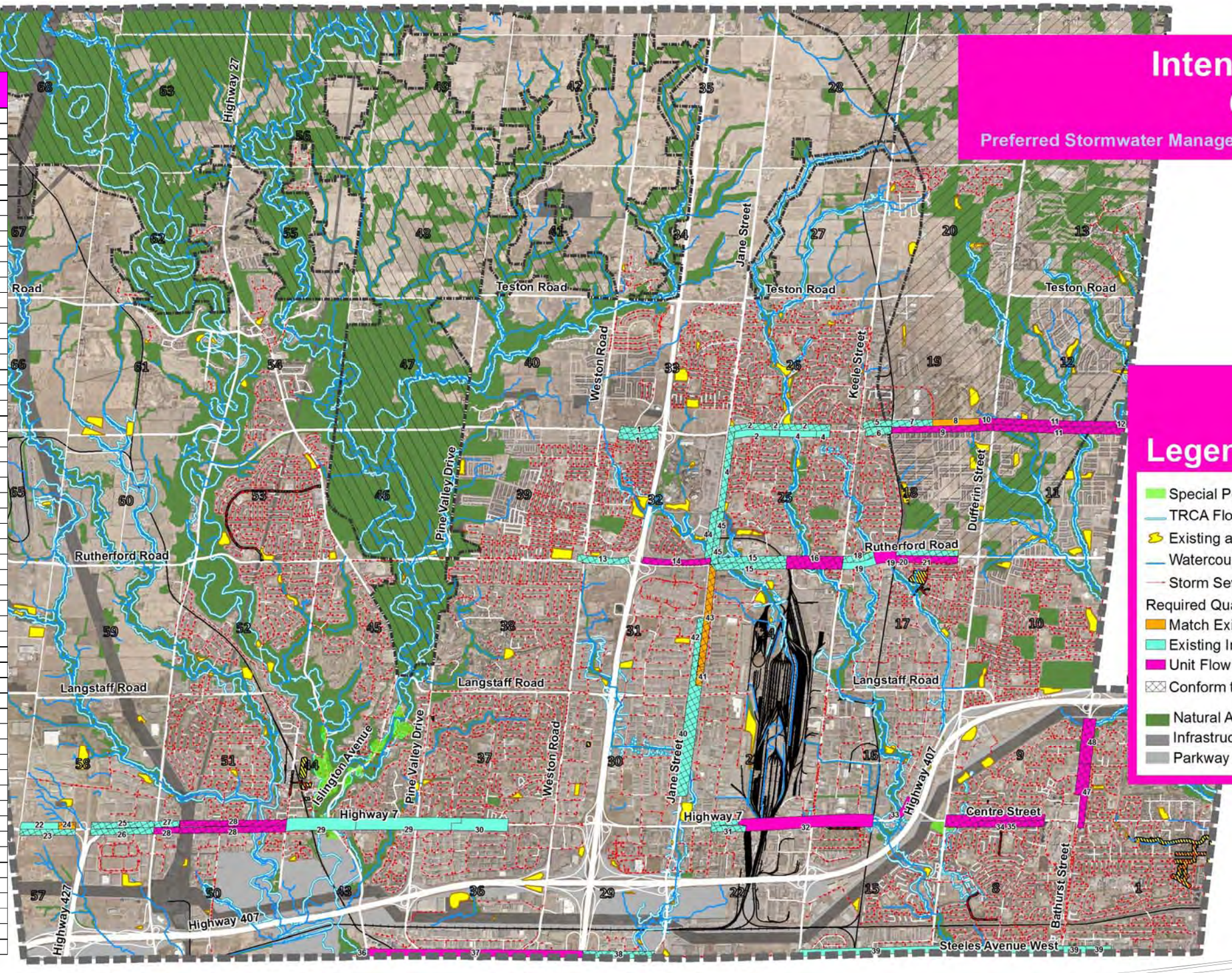
- Parks
- Private Open Spaces
- Agriculture
- Rural Residential
- Low-Rise Residential
- Low-Rise Mixed-Use
- Mid-Rise Residential
- Mid-Rise Mixed-Use
- High-Rise Residential
- High-Rise Mixed Use
- Commercial Mixed-Use
- Downtown Mixed-Use
- General Employment
- Prestige Employment
- Major Institutional
- New Community Areas
- Theme Park and Entertainment
- Natural Areas
- Infrastructure and Utilities

# Intensification Corridors

## Preferred Stormwater Management Alternatives

| Intensification Coordior | Lot Level Controls | End of Pipe Controls | Existing SWM Infrastructure / SWM Plan |
|---|---|---|---|
| Major Mackenzie Drive | | | |
| 1 | ● | ● | ● |
| 2 | ● | ○ | ○ |
| 3 | ○ | ● | ● |
| 4 | ● | ○ | ● |
| 5 | ● | ○ | ○ |
| 6 | ○ | ● | ● |
| 7 | ● | ○ | ● |
| 8 | ● | ○ | ○ |
| 9 | ○ | ● | ● |
| 10 | ● | ○ | ○ |
| 11 | ○ | ● | ● |
| 12 | ● | ○ | ○ |
| Rutherford Road | | | |
| 13 | ○ | ● | ● |
| 14 | ● | ● | ● |
| 15 | ● | ○ | ● |
| 16 | ● | ○ | ● |
| 17 | ● | ○ | ○ |
| 18 | ● | ○ | ● |
| 19 | ● | ○ | ○ |
| 20 | ○ | ● | ● |
| 21 | ● | ● | ● |
| Highway 7 | | | |
| 22 | ● | ○ | ○ |
| 23 | ● | ○ | ● |
| 24 | ● | ○ | ● |
| 25 | ● | ● | ● |
| 26 | ● | ● | ● |
| 27 | ● | ● | ● |
| 28 | ● | ○ | ● |
| 29 | ● | ○ | ○ |
| 30 | ● | ● | ● |
| 31 | ○ | ● | ● |
| 32 | ● | ○ | ○ |
| 33 | ● | ● | ○ |
| Centre Street | | | |
| 34 | ● | ○ | ○ |
| 35 | ● | ○ | ● |
| Steeles Ave. West | | | |
| 36 | ● | ○ | ○ |
| 37 | ● | ○ | ○ |
| 38 | ○ | ● | ● |
| 39 | ● | ○ | ○ |
| Jane Street | | | |
| 40 | ○ | ● | ● |
| 41 | ○ | ● | ● |
| 42 | ○ | ● | ● |
| 43 | ● | ● | ● |
| 44 | ○ | ● | ● |
| 45 | ● | ○ | ● |
| 46 | ○ | ● | ● |
| Bathurst Street | | | |
| 46 | ● | ● | ● |
| 47 | ● | ● | ● |

○ Least Preferred ● Most Preferred




## Legend

- Special Policy Area
- TRCA Floodline
- Existing and Approved Ponds
- Watercourse
- Storm Sewers

Required Quantity Control

- Match Existing
- Existing Infrastructure Capacity
- Unit Flow Rates
- Conform to Existing SWM Plan

- Natural Areas
- Infrastructure and Utilities
- Parkway Belt West Lands

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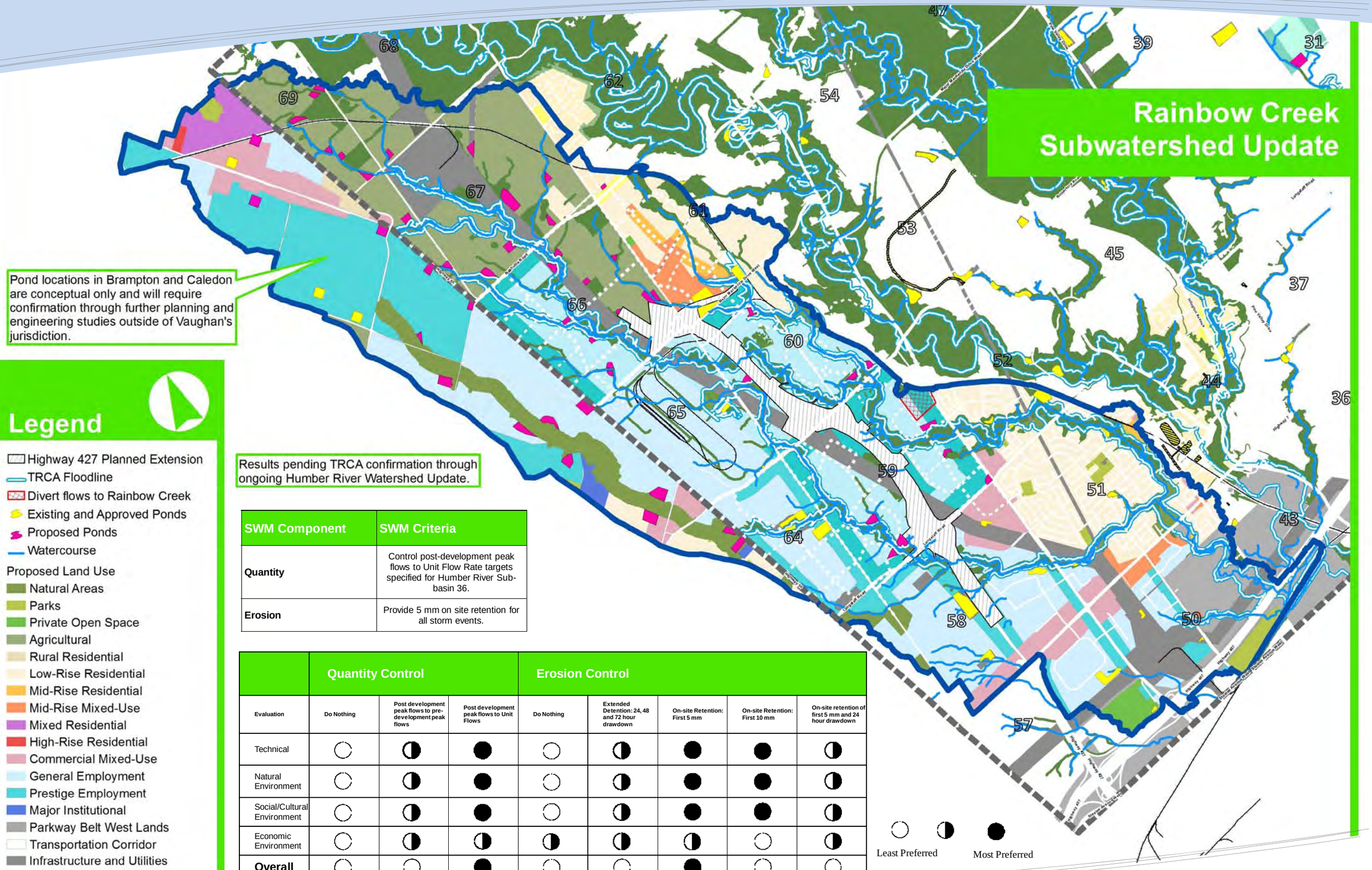
# Rainbow Creek Subwatershed Update

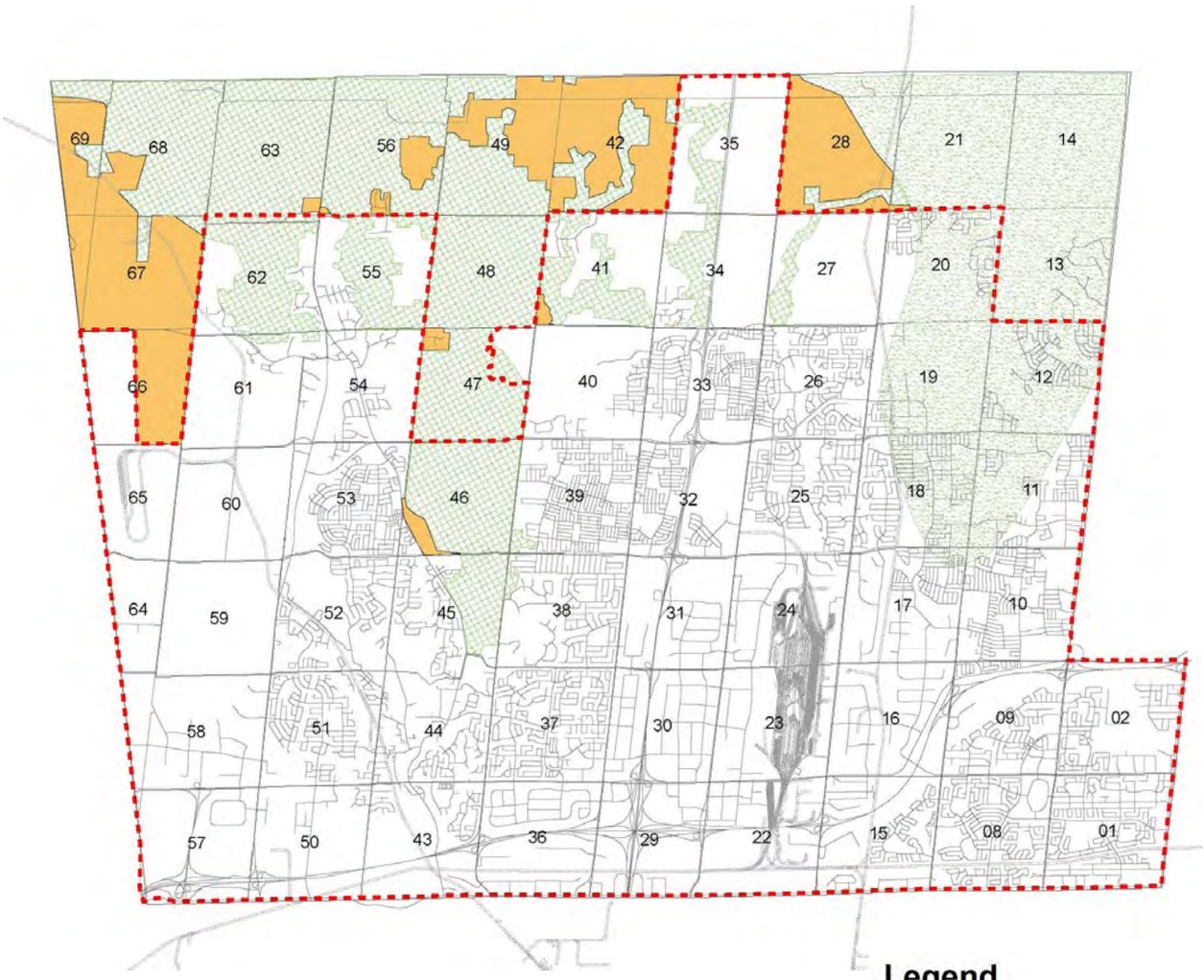



| SWM Component | SWM Criteria |
|---|---|
| **Quantity** | Control post-development peak flows to Unit Flow Rate targets specified for Humber River Sub-basin 36. |
| **Erosion** | Provide 5 mm on site retention for all storm events. |

| | Quantity Control | | | Erosion Control | | | | |
|---|---|---|---|---|---|---|---|---|
| Evaluation | Do Nothing | Post development peak flows to pre-development peak flows | Post development peak flows to Unit Flows | Do Nothing | Extended Detention: 24, 48 and 72 hour drawdown | On-site Retention: First 5 mm | On-site Retention: First 10 mm | On-site retention of first 5 mm and 24 hour drawdown |
| Technical | ○ | ◑ | ● | ○ | ◑ | ● | ● | ◑ |
| Natural Environment | ○ | ◑ | ● | ○ | ◑ | ● | ● | ◑ |
| Social/Cultural Environment | ○ | ◑ | ● | ○ | ◑ | ● | ● | ◑ |
| Economic Environment | ○ | ◑ | ◑ | ◑ | ◑ | ◑ | ○ | ◑ |
| **Overall** | ○ | ○ | ● | ○ | ○ | ● | ○ | ○ |

○ Least Preferred ◑ ● Most Preferred

# 2051 Storm Water Management Strategy




**Quantity**

- Control to Unit Flow Rates (Humber and Don Watersheds)
- Maintain existing drainage patterns as much as possible
- Quantity control to be provided by SWM facilities and/or lot level controls where appropriate

**Quality**

- Control to Enhanced Level 1 – 80% TSS Removal
- Protection of Aquatic Habitat
- Redside Dace: Cannot exceed 25 mg/l of TSS above background levels and 24 °C

**Erosion**

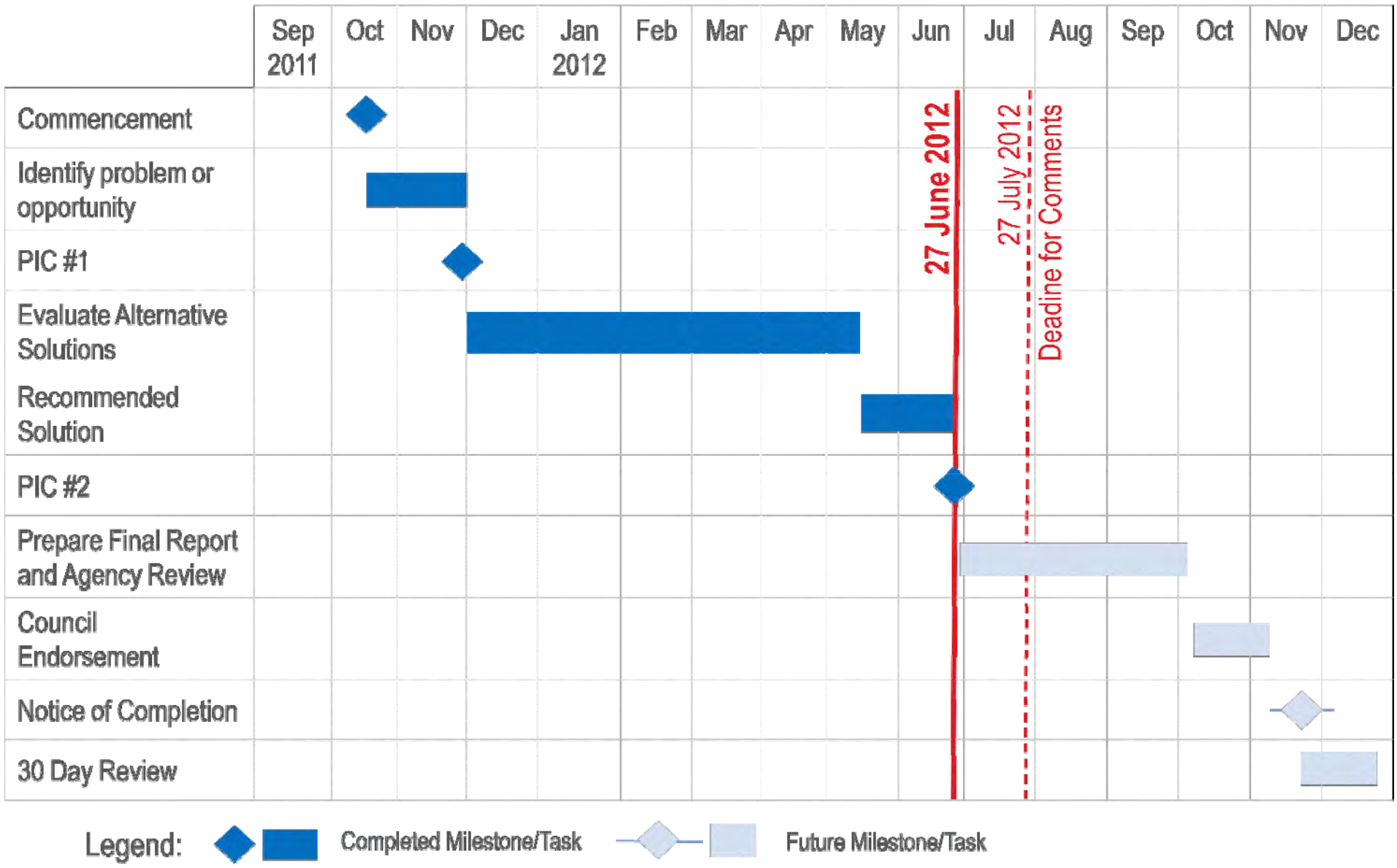
- SWM Facilities – minimum of 24 hours drawdown time for 25 mm event
- Individual erosion analysis required to determine downstream erosion risks

**Water Balance**

- Post development water budget to match existing water budget or on-site retention of 5 mm, which ever is greater

# Project Schedule & Next Steps

## Project Schedule




Next Steps

- Comments from this Public Information Centre will be considered along with those received from review agencies. Please provide your comments on a comment sheet and place it in the Comment Box, or send it to us by July 27th 2012.
- The Project Team will Review the feedback and respond to any comments received, document the studies and finalize the Master Plans.
- The Master Plans will be prepared and filed for 30 calendar days for agency and public review.
- Review agencies and the public will be notified of the completion of the studies and locations where the Master Plans can be reviewed.
- Schedule A, Schedule A+ and Schedule B projects not requiring further study would move forward to implementation based on the identified schedule.
- Should you have any questions, please contact the City or Project Teams.

# APPENDIX C-6
# Public Comments

# City-Wide Storm Water Master Plan

## COMMENT FORM

**June 27 2012 – Public Information Centre #2**
**City of Vaughan, 2141 Major Mackenzie Drive, Vaughan ON**

We are interested in hearing any comments you may have associated with this project. Thank you for clearly writing your comments in the space provided below.

This material will be maintained on file for use during the project and may be included in project documentation. Information collected will be used in accordance with the Freedom of Information and Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please submit your written comments before leaving the PIC. If you require more time to comment, please mail/fax in the comment sheet by July 27, 2012 to:


Saad Yousaf, P.Eng.
Storm Drainage Engineer
Engineering Planning & Studies
City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON L6A 1T1
Tel: 905-832-8585 ext 8251
Fax: 905-832-6145

Edward Graham, M.A.Sc, P.Eng.
Project Manager
Cole Engineering Group Ltd.
70 Valleywood Drive
Markham, ON L3R 4T5
Tel: 905-940-6161 ext. 373
Fax: 905-940-2064

Geoff Masotti, P.Eng.
Assistant Project Manager
Cole Engineering Group Ltd.
70 Valleywood Drive
Markham, ON L3R 4T5
Tel: 905-940-6161 ext. 254
Fax: 905-940-2064

**Website:** www.VaughanInfrastructure.ca
**Email:** SWMMP@VaughanInfrastructure.ca


**PLEASE CLEARLY PRINT YOUR NAME AND CONTACT INFORMATION BELOW:**
(personal information will not become part of the public record)

| | | | |
|---|---|---|---|
| Name | | Organization | |
| Street | | Telephone | |
| City/Town | | Fax | |
| Postal Code | | Email | |

VAUGHAN
Development/Transportation Engineering

# REGISTRATION SHEET

**Public Information Centre #2 – Master Plans for Urban Water Infrastructure in Vaughan**
**Municipal Class Environmental Assessment**

**Wednesday June 27, 2012 – City of Vaughan**

| Name (Please Print) | Address/E-mail | Phone Number |
|---|---|---|
| 11. MICHAEL DA | | |
| 12. DEEPAK PANJWANI | | |
| 13. Afshin Nasen | | |
| 14. Steve Roberts | | |
| 15. Hannah Mizuno | | |
| 16. | | |
| 17. | | |
| 18. | | |
| 19. | | |
| 20. | | |

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The MUNICIPAL INFRASTRUCTURE Group

# City of Vaughan, City-Wide Stormwater Management Master Plan
# Public Comments Tracking Table

| Notice of Commencement | | | | |
|---|---|---|---|---|
| **Stakeholder's Info.** | **Stakeholder's Comment** | **Responded By** | **Response Date** | **Response Details** |
| Shafiul Alam<br>Environment Officer<br>Environmental Assessment Coordination<br>T: 416-954-0600<br>F: 416-954-4328<br><br>Aboriginal Affairs and Northern Development Canada - Ontario Region<br>25 St. Clair Avenue East<br>Toronto, Ontario M4T 1M2<br>  <br>TORONTO-#442255-v1-The_City_of_Vaug | **From:** EACoordination_ON [mailto:EACoordination_ON@aandc-aadnc.gc.ca]<br>**Sent:** Monday, September 26, 2011 4:23 PM<br>**To:** Michael.Frieri@vaughaninfrastructure.ca; SWWMPP@vaughaninfrastructure.ca; WWWMP@vaughaninfrastructure.ca<br>**Subject:** The City of Vaughan – City-Wide Urban Water Infrastructure Master Plan Studies, Notice of Study Commencement<br><br>Good afternoon,<br><br>Attached is the response of the notice of commencement dated September 15, 2011 regarding the above noted project.<br><br>Thanks, | Arun Hindupur | 10/06/11 | Dear Abdul,<br>Thank you for your reply. As per your letter dated September 26, 2011, First Nations and Aboriginal groups in the vicinity of our study area have been included on our stakeholders list and will be kept informed throughout the study. Please do not hesitate to contact us if you have any questions.<br>Regards,<br>Edward Graham, M.A.Sc.Eng., P.Eng.<br>Storm Drainage/Storm Water Management (SWM) Master Plan<br>Cole Engineering Group Ltd.<br>70 Valleywood Drive,<br>Markham, ON Canada L3R 4T5<br>T: 905-940-6161 Tor. Line: 416-987-6161<br>F: 905-940-2064 |
| *Michelle Moretti, MCIP, RPP*<br>Planner<br>Municipal Services Office - Central Ontario<br>Ministry of Municipal Affairs and Housing | **From:** Moretti, Michelle (MAH) [mailto:Michelle.Moretti@ontario.ca]<br>**Sent:** Thursday, September 29, 2011 10:57 AM<br>**To:** michael.frieri@vaughaninfrastructure.ca<br>**Subject:** City-Wide Urban Water Infrastructure Master Plan EA<br><br>Hello Michael, | Kevin Brown, | 10/04/11 | **From:** Kevin Brown<br>**Sent:** October 4, 2011 10:53 AM<br>**To:** Moretti, Michelle (MAH)<br>**Subject:** RE: City-Wide Urban Water Infrastructure Master |

**City of Vaughan, City-Wide Stormwater Management Master Plan**
**Public Comments Tracking Table**

| Notice of Commencement | | | | |
|---|---|---|---|---|
| **Stakeholder's Info.** | **Stakeholder's Comment** | **Responded By** | **Response Date** | **Response Details** |
| 777 Bay St, 2nd Floor<br>Toronto, ON. M5G 2E5<br><br>Tel: (416) 585-6554<br>Fax: (416) 585-6882<br>  <br>City-Wide Urban Water Infrastructure | Thank you for your notice of September 15th regarding the above noted EA. By Copy of this email, I am requesting to be maintained on the mailing list and to be notified of any updates. My contact information is provided below.<br><br>Thanks, | | | Plan EA<br><br>Michelle:<br><br>Your contact information will be maintained for both the Water/Wastewater Master Plan and the Storm Water Master Plan.<br><br>Thanks,<br><br>-Kevin<br><br>_____<br><br>Kevin Brown, P.Eng<br>senior municipal project engineer<br><br>TMIG \| THE MUNICIPAL INFRASTRUCTURE GROUP LTD 8800 Dufferin Street Suite 200 \| Vaughan Ontario Canada L4K 0C5 \| office 905.738.5700 ext 247 \| fax 905.738.0065 \| cell 416.843.4689<br><br>EXPERIENCE \| EFFICIENCY \| |

# City of Vaughan, City-Wide Stormwater Management Master Plan
# Public Comments Tracking Table

| Notice of Commencement | | | | |
|---|---|---|---|---|
| **Stakeholder's Info.** | **Stakeholder's Comment** | **Responded By** | **Response Date** | **Response Details** |
| | | | | COMMITMENT |
| Virtual Engineers<br>  <br>RE City of Vaughan - Urban Water Infras | We are looking for help with our civil stormwater management projects. | Arun Hindupur | 10/11/11 | Thank you for your reply. If you have any specific questions related to the master plan studies please feel free to contact us.<br><br>Regards,<br><br>***Edward Graham, M.A.Sc.Eng., P.Eng.***<br>***Storm Drainage/Storm Water Management (SWM) Master Plan***<br>**Cole Engineering Group Ltd.**<br>70 Valleywood Drive,<br>Markham, ON Canada L3R 4T5<br>T: 905-940-6161 Tor. Line: 416-987-6161<br>F: 905-940-2064<br>E: SWMMP@VaughanInfrastructure.ca<br>• |
| **Sarah Kurtz**, P. Eng.<br>**SCS** Consulting Group Ltd.<br>30 Centurian Drive, Suite 100<br>Markham, ON, L3R 8B8 | Hi Ed, thank you for the notice. I was unfortunately not able to attend the PIC last night. Will the presentation materials be made available on the City's website? Or would it be possible to forward them to me?<br><br>Thanks in advance, | Arun Hindupur | 10/26/11 | Hello,<br><br>The presentation material from the first public information centre held on |

**City of Vaughan, City-Wide Stormwater Management Master Plan**
**Public Comments Tracking Table**

| Notice of Commencement | | | | |
|---|---|---|---|---|
| **Stakeholder's Info.** | **Stakeholder's Comment** | **Responded By** | **Response Date** | **Response Details** |
| Phone: **(905) 475-1900 (ext. 2246)**<br>Fax: **(905) 475-8335**<br>Cell: **(647) 881-7900**<br>E-Mail: skurtz@scsconsultinggroup.com<br>http://www.scsconsultinggroup.com<br>  <br>RE City of Vaughan - Urban Water Infrast | Sarah | | | October 13, 2011 are now available on the project website www.vaughaninfrastructure.ca. They can be found under the "Notices and Information" heading in both the Water/Wastewater Master Plan and Storm Drainage/Stormwater Management (SWM) Master Plan homepages.<br><br>Regards,<br><br>***Edward Graham, M.A.Sc.Eng., P.Eng.***<br>***Storm Drainage/Storm Water Management (SWM) Master Plan***<br>**Cole Engineering Group Ltd.**<br>70 Valleywood Drive,<br>Markham, ON Canada L3R 4T5<br>T: 905-940-6161 Tor. Line: 416-987-6161<br>F: 905-940-2064<br>E: SWMMP@VaughanInfrastructure.ca |

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| Antonietta Gentile<br>Coordinator<br>Environmental Assessment Planning<br>Planning and Development Division<br>Toronto and Region Conservation Authority<br>Tel: 416-661-6600 Ext. 5796<br>Fax: 416-661-6898 |  46410 - SWM Master Plan Vaughan NOCsb<br>  46411 - Water Wastewater Master F | | | • |
| **Candice Ward**, BES, MCIP, RPP<br>**SCS** Consulting Group Ltd.<br>30 Centurian Drive, Suite 100<br>Markham, ON, L3R 8B8<br>Phone: **(905) 475-1900 (ext. 2236)**<br>Fax: **(905) 475-8335**<br>Cell: **(416) 991-9915**<br>E-Mail: cward@scsconsultinggroup.com<br>http://www.scsconsultinggroup.com<br>  <br>Storm Drainage Storm Water Manage | Good afternoon.<br><br>Following the PIC #1, scheduled for October 13, 2011, it was our understanding that the material presented at the meeting will be posted on the City of Vaughan's Infrastructure Planning website. We cannot seem to locate this on the website. Any chance you could provide us with the material presented earlier this week at PIC #1? Please confirm at your earliest convenience.<br><br>If you have any questions or require additional information, please feel free to contact me.<br><br>Thank you kindly, | | | Hello,<br><br>The presentation material from the first public information centre held on October 13, 2011 are now available on the project website www.vaughaninfrastructure.ca. They can be found under the "Notices and Information" heading in both the Water/Wastewater Master Plan and Storm Drainage/Stormwater Management (SWM) Master Plan homepages.<br><br>Regards,<br><br>***Edward Graham, M.A.Sc.Eng.,*** |

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| | | | | ***P.Eng.***<br>***Storm Drainage/Storm Water Management (SWM) Master Plan***<br>**Cole Engineering Group Ltd.**<br>70 Valleywood Drive,<br>Markham, ON Canada L3R 4T5<br>T: 905-940-6161 Tor. Line: 416-987-6161<br>F: 905-940-2064<br>E: SWMMP@VaughanInfrastructure.ca<br>• |
| Dorothy Moszynski, MCIP, RPP<br>Environmental Resource Planner & EA Coordinator<br>Ministry of Environment<br>Central Region, Technical Support Section<br>5775 Yonge Street, 8th Fl.<br>North York, ON M2M 4J1<br>Tel: (416) 326-3469<br>Fax: (416) 325-6347<br>dorothy.moszynski@ontario.ca | Good morning Michael, Edward, and Fabian,<br><br>Could one of you please call me about these plans when you get a chance.<br><br>Thank you, | Fabian Papa | 10/21/11 | Hi Arun & Kevin:<br><br>I spoke with Dorothy yesterday afternoon and her main concern is that there are a number of EAs going on in York Region that it's rather difficult to keep track of what their purposes are and how they're interrelated. I advised her of the City-wide nature of these studies which would incorporate relevant findings from the other EAs to the extent practical and possible. |

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| | | | | She would like to see MOE representation – through herself – on the Technical Advisory Committee. We should accordingly consider expanding the invitee list for the next TAC to include her as well as consider sending her the minutes of TAC Meeting #1. MOE has or will be submitting a letter in response to the Notice of Commencement.<br><br>We should send her a quick e-mail when the PIC boards are posted to the website advising her of same and thanking her for her interest. If we decide that MOE should have a seat on the TAC – which I don't see why not – then we could send her the TAC Meeting #1 minutes in that same communication.<br><br>I will leave it to each of you to communicate this further internally as you see most appropriate and efficient. |

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| | | | | Regards,<br><br>**Fabian Papa** M.A.Sc., M.B.A., P.Eng.<br>PEO Designated Consulting Engineer<br>Special Lecturer, University of Toronto<br>C: 416 565 0158 E: fpapa@fabianpapa.com<br><br>**From:** Arun Hindupur [mailto:ahindupur@coleengineering.ca] **On Behalf Of** Vaughan SWMMP<br>**Sent:** October 31, 2011 2:50 PM<br>**To:** Moszynski, Dorothy (ENE)<br>**Subject:** RE: Master plans- more info please<br><br>Hello Dorothy,<br><br>As per your discussion with Fabian Papa, we have added you on the Technical Advisory Committee (TAC) for the City-Wide Water Infrastructure Studies in the City of Vaughan. Please see link to the project website |

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| | | | | (http://www.vaughaninfrastructure.ca/). The display boards that were presented at the first Public Information Centre (PIC) held on Thursday October 13th at the City of Vaughan can be downloaded by going to either the water/wastewater or storm drainage/stormwater management (swm) master plan homepages and clicking on the Notices and Information tab on the right hand side.<br><br>Also attached are the minutes from the first TAC meeting held on Tuesday September 27th.<br><br>If you think necessary, a meeting can be arranged to bring you up to speed on our study scope and objectives. If you have any further questions or comments, please feel free to contact the study team.<br><br>Regards, |

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| | | | | ***Edward Graham, M.A.Sc.Eng., P.Eng.***<br>***Storm Drainage/Storm Water Management (SWM) Master Plan***<br>**Cole Engineering Group Ltd.**<br>70 Valleywood Drive,<br>Markham, ON Canada L3R 4T5<br>T: 905-940-6161 Tor. Line: 416-987-6161<br>F: 905-940-2064<br>E: SWMMP@VaughanInfrastructure.ca<br><br>Thank you very much for sending this information! I don't think a meeting will be necessary at this time, I will see you at the next TAC.<br><br>Dorothy |
| | • | Arun Hindupur | 10/31/11 | As per email from Mike Frieri, MOE to be added to TAC |

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| | | | |  Vaughan Master Plan Studies.msg<br><br>TAC meeting minutes sent to Dorothy:<br>  RE Master plans- more info please.msg |
| **Rosi Zirger**<br>**A/Heritage Planner \| Central and Southeast**<br>Ministry of Tourism and Culture \| Culture Services Unit<br>Tel. 416.314.7159 \| Fax 416.314.7175<br>rosi.zirger@ontario.ca<br>**Ministry of Tourism and Culture**<br>Programs and Services Branch<br>Culture Services Unit<br>401 Bay Street, 17th Floor<br>Toronto, Ontario M7A 0A7 | **Project: Master Plans for Urban Water / Waterwater Infrastructure in Vaughan**<br>**Location: City of Vaughan, Region of York**<br>**MTC File: 19EA070**<br><br>To: Michael Frieri, Manager of Engineering Planning & Studies, City of Vaughan<br>Edward Graham, Cole Engineering Group Limited<br>Fabian Papa, The Municipal Infrastructure Group Ltd and Fabian Papa & Partners Inc.<br><br>The Ministry of Tourism and Culture (MTC) has received a Notice of Study Commencement and Information Package for the project mentioned above. As part of the Class Environmental Assessment process, the MTC has an interest in the conservation of cultural heritage resources including: | Arun Hindupur | 11/09/11 | Dear Rosi,<br><br>Thank you for your email. We have updated the contact information as requested and will be sure to include your ministry of project alerts and progress. As this is a city wide infrastructure study and master plan, an archaeological assessment and cultural heritage assessment are not being considered as a part of this study. Should specific projects be identified as part of this study, an archaeological and heritage |

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|  Screening for Impacts to Built Herit<br>  BuiltHeritage-CHL-Checklist-MTC-Nov2010 | • archaeological resources,<br>• built heritage resources, and<br>• cultural heritage landscapes.<br><br>MTC would, therefore, be interested in remaining on the circulation list and being informed of the project as it proceeds through the EA process. We ask that you update your contact list to send future notices to **Rosi Zirger A/Heritage Planner at the address below**.<br><br>Could you kindly advise whether archaeological assessments and cultural heritage assessments (built heritage and culture heritage landscapes) are being undertaken as part of these environmental assessments? For your information and reference, I have attached our Ministry's standard checklists for identifying potential heritage resources within the study area.<br><br>**Archaeology**<br>Attached is MTC's Criteria for Evaluating Archaeological Potential, which identifies characteristics of the property that indicate whether archaeological resources might be present and/or impacted. The completed checklist will assist MTC to determine whether an archaeological assessment by an archaeologist licensed under the Ontario Heritage Act will be necessary for this project.<br><br>**Built Heritage and Cultural Heritage Landscape**<br><br>In addition, in order to determine the existing cultural conditions, known and potential built heritage resources and cultural heritage landscapes should be identified. I have also attached our Ministry's standard checklist for identifying potential heritage resources within the study area. It is suggested that, you contact the Heritage Planner to determine if there are any properties that have been listed or designated by the municipality under | | | assessment of those areas would be recommended as part of this study in order to confirm the viability and guide the implementation of any works. We will however use the City's heritage information database to determine if there would be concerns associated within the City that could impact the recommendations of specific projects associated with this master plan.<br><br>Please feel free to contact us if you have any questions or require additional information.<br><br>Regards,<br><br>***Edward Graham, M.A.Sc.Eng., P.Eng.***<br>***Storm Drainage/Storm Water Management (SWM) Master Plan***<br>**Cole Engineering Group Ltd.**<br>70 Valleywood Drive,<br>Markham, ON Canada L3R 4T5<br>T: 905-940-6161 Tor. Line: |

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| | the *Ontario Heritage Act*. Contacting the municipal heritage committee, municipal heritage planner or any relevant community heritage organizations will help you in completing this checklist. Local knowledge plays an important role in the identification of heritage resources, and information gathered at early public meetings may also inform some sections of the checklist.<br><br>The completed checklist will to used by MTC to further advise on any cultural heritage assessment work that may be advisable in the circumstances.<br><br>Best regards,<br>• | | | 416-987-6161<br>F: 905-940-2064<br>E: SWMMP@VaughanInfrastructure.ca<br><br>Acknowledgement of receipt from Rosi Zirger on 11/10/11:<br><br>Thank you for the information.<br><br>**Rosi Zirger**<br>**A/Heritage Planner \| Central and Southeast**<br>Ministry of Tourism and Culture \| Culture Services Unit<br>Tel. 416.314.7159 \| Fax 416.314.7175<br>rosi.zirger@ontario.ca<br><br>**Ministry of Tourism and Culture**<br>Programs and Services Branch<br>Culture Services Unit<br>401 Bay Street, 17th Floor<br>Toronto, Ontario M7A 0A7<br><br>  <br>RE Master Plans for Urban Water Water |
| Abeer Ansari | Hello, | Arun Hindupur | 10/23/2011 | Abeer, |

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| York University<br>aansari@yorku.ca | I attended the PC1 on Oct. 13th. I was told the poster slides at the information centre would be posted on the website the next day. I have been waiting since then for them. Would it be possible to send the slides to me via e-mail? I am hoping to receive them tomorrow morning, as I need to submit a report on the project tomorrow afternoon. Thank you.<br><br>Regards,<br>Abeer Ansari | | | Our apologies for the delay. The presentation material should be available early this week on the project website. I will send you an email with the link once they are posted.<br><br>Regards,<br><br>***Edward Graham, M.A.Sc.Eng., P.Eng.***<br>***Storm Drainage/Storm Water Management (SWM) Master Plan***<br>**Cole Engineering Group Ltd.**<br>70 Valleywood Drive,<br>Markham, ON Canada L3R 4T5<br>T: 905-940-6161 Tor. Line: 416-987-6161<br>F: 905-940-2064<br>E: SWMMP@VaughanInfrastructure.ca<br>• |
| Stephen Roberts<br>cell 416-606-2578 | Hello Michael,<br>As a follow up to my voice message. My concern is for the proper ecological functioning of the Black Creek and storm water system - and Councillor Sandra Racco gave me your name to ask about the EA. AM I to interpret that the area within the purple dotted line may still be used for stormwater | TMIG?? | TMIG?? | • TMIG?? |

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|  SWM Ponds Jane and Hwy 7.msg | purposes even though the owner of that land wishes to re-designate the north-east corner of hwy7 & Jane from valley land to corporate centre node (in order to build condos).<br>Stephen Roberts<br>cell 416-606-2578<br>• | | | |
| Mary Yang<br>Engineer-In-Training<br><br>Tel: 416-252-5315 X 5420<br>Fax: 416-231-5356<br><br>SNC-Lavalin Inc.<br>195 The West Mall<br>Toronto, Ontario, Canada<br>M9C 5K1 | Good afternoon Michael,<br><br>SNC-Lavalin Inc. is retained by MTO for detail design services on the Highway 400 widening contract (from Major MacKenzie Drive to King Road).<br>We have received notification for PIC #2 - Vaughan - Master Plans for Urban Water Infrastructure from Cassandra Leal below.<br>Part our proposed Highway 400 widening work falls within City of Vaughan, with proposed constructions on King-Vaughan Road and Kirby Road in the vicinity of Highway 400..<br>Could you kindly provide us the City's Water Infrastructure Master Plan for us decide if there will be any implications on MTO's Highway 400 widening project or vice versa?<br><br>Thanks, | TMIG?? | TMIG?? | • TMIG?? |
| *Heather Glass, P.Eng.*<br>Senior Project Engineer<br>Highway Engineering, York-Simcoe<br>Engineering Office, Central Region<br>Ministry of Transportation, Ontario<br>phone: (416) 235-5521<br>fax: (416) 235-3576 | Hi Michael<br><br>I received your notice of the 2nd PIC for the Master Plans for Urban Water Infrastructure in Vaughan. While I do not see the need to attend the June 27th PIC, please continue to keep MTO staff informed of the studies' progress.<br><br>Regards, | | | • |

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| email: heather.glass@ontario.ca | | | | |
| Vinnie Ussia | Please find enclosed a copy of what was sent to Saad Yousaf, Edward Graham, and Geoff Masotti.<br><br>Looking forward to your comments.<br><br>Sincerely,<br><br>Vinnie Ussia<br><br>  <br>image.pdf | Arun Hindupur | 06/29/12 | Hello Vinnie,<br><br>Thank you for your response. Your comments appear to be more related to the water/wastewater component of the study and as such have been forwarded to the appropriate team members.<br><br>Regards,<br><br>Edward Graham, M.A.Sc.Eng., P.Eng.<br>Storm Drainage/Storm Water Management (SWM) Master Plan<br>Cole Engineering Group Ltd.<br>70 Valleywood Drive,<br>Markham, ON Canada L3R 4T5<br>T: 905-940-6161 Tor. Line: 416-987-6161<br>F: 905-940-2064<br>E: SWMMP@VaughanInfrastructure.ca |

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| | | | | • <br>• TMIG?? |
| Peter Bau, P.Eng.<br>SR PROJECT MANAGER<br><br>Tel: 416 252 5315 X 2033<br><br>SNC-Lavalin Inc.<br>195 The West Mall<br>Toronto, Ontario, Canada<br>M9C 5K1 | Fabian and Michael:<br><br>We have reviewed the City-Wide Water/Wastewater Master Plan for PIC #1 on Oct. 13, 2011 and the Master Plans for Urban Water Infrastructure in Vaughan for PIC # 2 on June 27, 2012 from the Vaughan Infrastructure web site.<br><br>The existing installation (water, wastewater and storm water) as shown on the City-Wide Water/Wastewater Master Plan for PIC #1 will not affect our detail design of the proposed Hwy 400 widening from Major Mackenzie Dr. to King Rd. for the Ministry of Transportation (MTO). We will have the design package completed in late September/early October this year.<br><br>From the Master Plans for Urban Water Infrastructure for PIC # 2, the following improvement alternatives may have implications/impacts to the proposed Hwy 400 widening from Major Mackenzie Dr. to King Road, depending on the exact location of the proposed improvement:<br><br>• Water Servicing Alternative ID W3 (PD7) along Teston Road which crosses Hwy 400;<br>• Water Servicing Alternative ID W4 (PD8) along Kirby Road and along King-Vaughan Road which crosses Hwy 400 separately; and<br>• Sanitary Servicing Alternative ID WW3 – Teston Sub-Trunk Sanitary Sewer and SPS along Teston Road which crosses Hwy 400;<br><br>Should you have more details on the above improvements, you should forward it to Ms. Heather Glass, the MTO Project Manager for the proposed Hwy 400 widening from Major Mackenzie Dr. to King Rd., for her review and comments. | TMIG?? | TMIG?? | TMIG?? |

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| | If you have any questions, please do not hesitate to contact us.<br><br>Regards | | | |
| **Maria Herrera**<br>Assistant to<br><br>Fieldgate Developments<br><br>5400 Yonge Street, Suite 501<br>Toronto, ON M2N 5R5 | Good afternoon Mr. Yousaf,<br><br>Please find attached correspondence **RE:** Master Plans for Urban Water Infrastructure in Vaughan - Storm Drainage/Storm Water Management Master Plan.<br><br>We appreciate your attention to this matter.<br><br>With regards,<br><br>  <br>Letter to Yousaf, S.<br>re - Master Plan for U | Cole Engineering Group | 08/09/2010 |  <br>080912 - Fieldgate Developments (R. Ma |
| Rick Mangotich<br>**FIELDGATE DEVELOPMENTS**<br>*Office: (416) 227-9005, Ext. 337*<br>*Mobile: (416) 629-2927* | Thank you Arun and to you also Saad. The letter was handed to me just after my email was sent - "Ask and you shall receive" I guess.<br><br>On review of your letter I thank you for the information and confirmation that pond sizes and locations are conceptual. In light of your response, I would like to reiterate our request that SWM facilities be shown within the Greenbelt in the Master Plan document and that the document indicate that the locations are conceptual and will be subject to the further studies as you indicate in your correspondence. This will serve to acknowledge that the Greenbelt is an acceptable and appropriate preference for these types of uses. Locating SWM facilities in acceptable locations within the Greenbelt provides engineering efficiencies, reduces outfall requirements and results in | Geoff Masotti | 08/14/12 | Hi Rick,<br><br>The Greenbelt legislation does allow for the placement of SWM facilities in the Greenbelt under specific circumstances and conditions. This is something that we will take under strong advisement. At this time we expect that we will be providing flexibility around the |

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| | more efficient use of the overall land resource. Greater sustainability is achieved when the land resource is used efficiently.<br><br>In addition to the above, it would be appreciated if you would kindly provide details of the EA study that has been completed to determine the SWM strategy as referenced in your first paragraph.<br><br>Thank you for your attention to these requests.<br><br>  <br>RE Master Plans for Urban Water Infrastr | | | locations of ponds within the text of the Master Plan report. I trust this will meet your needs.<br><br>Just to reiterate our previous point, further analysis through your engineering studies will have to be conducted to support the placement of SWM facilities within the Greenbelt through the later stages of the planning process.<br><br>Best Regards,<br><br>**Geoff Masotti, P.Eng.**<br>**Project Manager, Water Resources**<br><br>***Cole Engineering Group Ltd.***<br>***70 Valleywood Drive,***<br>***Markham, ON Canada L3R 4T5***<br>*T: 905-940-6161 Ext. 254 Tor. Line: 416-987-6161*<br>*C: 416-230-9222 F: 905-940-2064*<br>*E:* |

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| | | | | gmasotti@ColeEngineering.ca<br>www.ColeEngineering.ca |
| Rick Mangotich<br>**FIELDGATE DEVELOPMENTS**<br>*Office: (416) 227-9005, Ext. 337*<br>*Mobile: (416) 629-2927* | Thank you again for your reply. I would like to arrange a meeting to discuss this matter before a draft document is released as I believe it is very significant and may result in negative impact to the value of our land. Please advise of your availability the week of August 27. | Geoff Masotti | 08/14/12 | Hi Rick,<br><br>We agree with your assessment that ponds can be placed in the greenbelt where feasible; however, if you feel a meeting is necessary we're pleased to host it here at our office. Saad, do you feel the City should be in attendance?<br><br>I'm largely available the week of August 27th at this point in time if you'd like to give me a few dates/times I can arrange some meeting space here at our office.<br><br>Regards,<br>• |
| Rick Mangotich<br>**FIELDGATE DEVELOPMENTS**<br>*Office: (416) 227-9005, Ext. 337*<br>*Mobile: (416) 629-2927* | Geoff, further to our discussion just now, thank you for your consideration. As I understand, the graphic representation of the SWM facilities will be changed to an asterisk, dot or some other symbol and consideration will be given to having the symbol straddle the greenbelt boundary at the block 41 location. There will be opportunity to review this in the draft document before the Master Plan is finalized and we will be advised when the draft is available. On this basis, thank you, we can forego the meeting and will await the draft document. | | | • |

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| | I appreciate your help. | | | |

Your file Votre référence

Our file Notre référence

ON-E 5010-4-1
[CIDMS#442255]

September 26, 2011

Mr. Michael Frieri
Manager, Engineering Planning and Studies
The City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON L6A 1T1

Dear Mr. Frieri:

**RE: The City of Vaughan – City-Wide Urban Water Infrastructure Master Plan Studies, Notice of Study Commencement**

Thank you for the notice of September 15, 2011 in relation to the above-referenced project.

To assist you with identifying First Nations and other Aboriginal groups within the vicinity of the proposed project, the AANDC Ontario Region Environment Unit offers the following information resources:

- The Chiefs of Ontario website (http://www.chiefs-of-ontario.org) provides a directory of contact information for all First Nations and Chiefs, as well as a map of the locations of Ontario First Nations.
- Natural Resources Canada maps showing all First Nation reserve lands, are available for purchase at http://clss.nrcan.gc.ca/indexmap-carteindex-eng.php
- Natural Resources Canada's online *Historical Indian Treaties* map, showing historical First Nation treaties across Canada, is available at: http://atlas.nrcan.gc.ca/site/english/maps/historical/indiantreaties/historicaltreaties
- The Aboriginal Canada Portal has a list of all First Nations in Ontario (http://www.aboriginalcanada.gc.ca/acp/community/site.nsf/en/on-all-b.html), with links to maps of individual communities.
- Aboriginal Communities and Friendship Centres can be viewed in Google Earth, at http://www.aboriginalcanada.gc.ca/acp/community/site.nsf/GE_landingpage_en.html
- The Métis Nation of Ontario (http://www.metisnation.org/) may be able to provide information regarding Métis interests with respect to a particular project.
- First Nation reserve lands are mapped in a tan colour in Mapquest .(http://www.mapquest.com/).

For information with respect to claims, litigation, treaties and Métis and Non-Status Indians interests, you may contact our Consultation and Accommodation Unit (CAU), located at AANDC Headquarters. The CAU can provide information on:

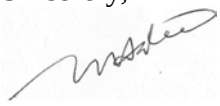
1) The location of Aboriginal communities, reserves or their traditional territory, as claimed; and/or
2) The asserted or established rights that pertain to those communities or to a given geographic location.

For these inquiries you may contact them directly at CAU-UCA@aandc-aadnc.gc.ca.

Please be advised that all future notifications concerning this or any other proposed projects in Ontario should be emailed to EACoordination_ON@aandc-aadnc.gc.ca or sent to the following address:

Environment Unit
Re: Environmental Assessment Coordination
Aboriginal Affairs and Northern Development Canada
25 St. Clair Avenue East, 8th Floor
Toronto, Ontario, M4T 1M2

Sincerely,



M. Shafiul Alam
Environment Officer
Aboriginal Affairs and Northern Development Canada
25 St. Clair Avenue East, 8th Floor
Toronto, Ontario, M4T 1M2

TORONTO AND REGION Conservation
for The Living City

October 13, 2011

CFN 46410
Xref CFN 46411

**BY MAIL AND EMAIL** (Michael.frieri@vaughaninfrastructure.ca)

Mr. Michael Frieri, C.E.T.
Manager of Engineering Planning and Studies
Development/Transportation Engineering Department
City of Vaughan
2141 Major Mackenzie Drive
Vaughan, Ontario
L6A 1T1

Dear Mr. Frieri:

**Re: Response to Notice of Study Commencement**
**City-Wide Storm Drainage/Storm Water Management Master Plan**
**Humber and Don River Watersheds; City of Vaughan; Regional Municipality of York**

Toronto and Region Conservation Authority (TRCA) staff received the Notice of Commencement for the above noted Environmental Assessment (EA) on September 20, 2011. It is our understanding that this undertaking involves a city wide master plan study for the storm drainage and storm water management for the City of Vaughan that will evaluate the use of alternative SWM practices for effective treatment of stormwater from source, conveyance and end of pipe controls to promote protection of the natural environmental systems.

## TRCA Areas of Interest

Staff has identified the following Areas of Interest within the study area:

Regulated Areas

- Regulation Limit
- Crest of Slope
- Meander Belt
- Regulatory Flood Plain
- Wetlands
- Watercourses

TRCA Program and Policy Areas

- Aquatic Species and Habitat
- Aquifers and Hydrogeological Features
- Archaeological and Heritage Resources
- Conservation Land (TRCA property)
- Environmentally Significant Areas
- Habitat Implementation Plans
- Living City Programs:
  - Renewable Energy
  - Sustainable Communities
  - Sustainable Technologies
  - Living City Trails
- Special Policy Areas
- Terrestrial Natural Heritage Strategy
- Terrestrial Species and Habitat

Provincial Program Areas

- Areas of Natural and Scientific Interest
- Asian Long-horned Beetle Regulated Area
- Greenbelt
- Oak Ridges Moraine
- Provincially Significant Wetlands
- Wellhead Protection Area

Upon request, digital mapping and program information for the Areas of Interest will be sent under separate cover. Please ensure that the status, potential impacts and opportunities for enhancement related to these Areas of Interest are documented and assessed through a review of background material, technical study, field assessment and detailed evaluation, as appropriate.

**Selection of Alternatives**

In consideration of TRCA's *Valley and Stream Corridor Management Program*, Ontario Regulation 166/06, and TRCA's other programs and policies, staff requires that the preferred alternative meets the following criteria:

1. Prevents the risk associated with flooding, erosion or slope instability.
2. Protects and rehabilitates existing landforms, features and functions.
3. Provides for aquatic, terrestrial and human access.
4. Minimizes water/energy consumption and pollution.
5. Addresses TRCA property and heritage resource concerns.

TRCA staff recommends that a summary of detailed design commitments be included in the EA as a Pre-design Brief. This summary should include, but not be limited to:

a. An aerial photo indicating the study area, regulated area, existing conditions and preferred solution/design;
b. Text indicating the preferred alternative solution/design;
c. A Reference list of alternative solutions and designs considered;
d. A synopsis of all TRCA requirements and technical commitments.

It is intended that the proponent and their consultants, as well as TRCA, would use the Pre-design Brief during the preliminary stages of detailed design. In the Pre-design Brief, commitments made during the EA would be clearly articulated in order to facilitate a 90 % detailed design submission to TRCA for all required permits. TRCA staff would then be able to review the required studies, reports or plans; and confirm any additional study requirements or revisions to the submitted materials. Ideally, the completion of the Pre-Design Brief will result in a more timely and streamlined permit approval process in the future.

**TRCA Review**

I understand that Carolyn Woodland, Director, Planning and Development, June Little, Manager Development, Planning and Regulation and Sameer Dhalla, Senior Manager, Water Resources attended a Technical Steering Committee meeting on September 27, 2011. Further to a subsequent discussion with Carolyn Woodland I have been approved as the project manager for the file. As such, I will ensure that they continue to be directly involved in each stage of the review. Please note that the above mentioned staff will continue to participate on the Technical Steering Committee. In addition, please add TRCA's Don Watershed Specialist Adele Freeman and Humber Watershed Specialist Gary Wilkins to the project mailing list to receive any public information updates.

A copy of the TRCA Environmental Assessment Review Program Service Delivery Standards, and a summary chart is enclosed for your reference. We recommend you refer to these submission standards during the study to facilitate TRCA review. Please provide the following submissions to expedite TRCA review.

- Notices of public meetings and display material and handouts
- Four hard copies of the Phases 1 and 2 Report or four hard copies of the Draft EA Document, and
- One hard copy and one digital copy of the Final EA Document.

In accordance with TRCA's Administrative Fee Schedule for Environmental Assessment and Regulatory Review Services, the fee for reviewing this Master Plan is $10,400. Upon receipt of the Environmental Assessment review fee, staff will forward the relevant background information and data.

Should you have any questions, please contact me at extension 5759 or by email at sbevan@trca.on.ca.

Yours truly,

Suzanne Bevan

Suzanne Bevan
Senior Planner, Environmental Assessment Planning
Planning and Development

Encl.: TRCA Areas of Interest Summary Table
Service Delivery Standards - Recommended TRCA Contact Points

**BY EMAIL**

| | |
|---|---|
| City of Vaugan: | Saad Yousaf (Saad.Yousaf@vaughan.ca) |
| Consultant: | Edward Graham, Cole Engineering Group Limited (swmmp@vaughaninfrastructure.ca) |
| TRCA: | Adele Freeman, Don Watershed Specialist |
| | Gary Wilkins, Humber Watershed Specialist |
| | Carolyn Woodland, Director, Planning and Development |
| | Beth Williston, Senior Manager, Environmental Assessments |
| | June Little, Manager, Development, Planning and Regulation |
| | Sameer Dhalla, Senior Manager, Water Resources |

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# TRCA AREAS OF INTEREST



EA Requirements

Document and assess the status, potential impacts and opportunities for enhancement that relate to the following Areas of Interest through a review of background material, technical study, field assessment and detailed evaluation, as appropriate. Make reference to the applicable Program and Policy documents. Include in the EA Document appendices any minutes, structure summary sheets for watercourses or wetlands, or other material collected through meetings with TRCA staff. Natural features may need to be confirmed on site by TRCA staff.

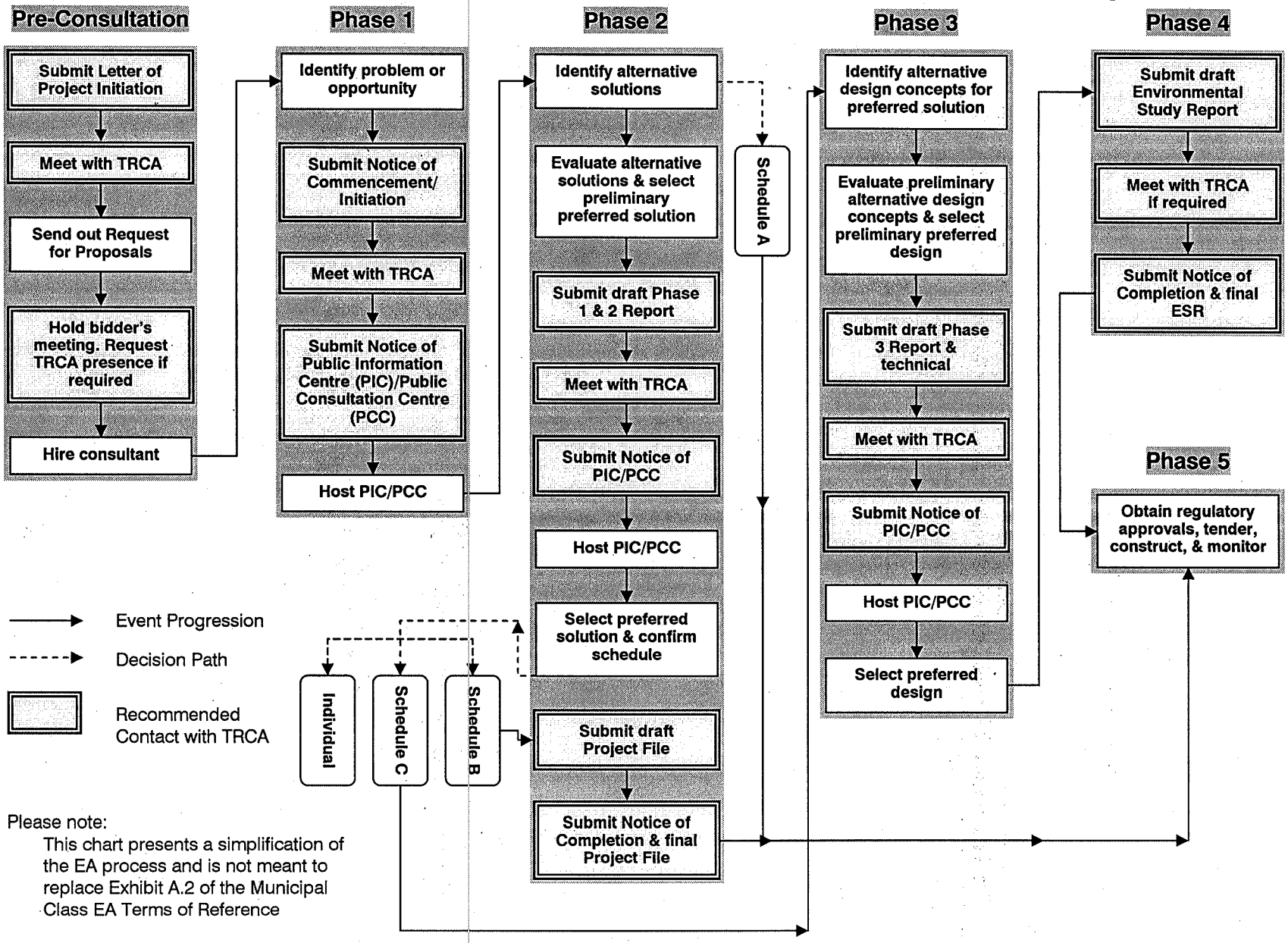
| Area of Interest / Data Availability | Program and Policy Concerns |
|---|---|
| **TRCA REGULATED AREAS** | |
| Regulation Limit<br>***GIS data available*** | In accordance with Ontario Regulation 166/06 (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses), a permit is required from the TRCA prior to any development (e.g. construction) if, in the opinion of TRCA, the control of flooding, erosion, dynamic beaches or pollution or the conservation of land may be affected. The Regulation Limit defines the greater of the natural hazards associated with Ontario Regulation 166/06 (listed below).<br><br>NOTE: The Regulation Limit provides a geographical screening tool for determining if Ontario Regulation 166/06 will apply to a given proposal. Through site assessment or other investigation, it may be determined that areas outside of the defined Regulation Limit require permits under Ontario Regulation 166/06. In these instances, it is the text of the regulation that will prevail; modifications to the regulation line may be required.<br><br>Any development within the Regulation Limit must comply with the applicable sections of TRCA's *Valley and Stream Corridor Management Program*. |
| Crest of Slope | Valley and stream corridors are dynamic systems that provide important natural functions and linkages for the physical, chemical and biological processes of wildlife, watercourses, and other natural features. The Crest of Slope identifies the physical limit of these corridors; however, due to ecological sensitivities, development restrictions typically extend beyond the actual Crest of Slope. |
| Meander Belt | Channel migration has a significant impact on infrastructure, structures and property located near river systems. Determining channel stability is important to ensure that damage from erosion, down-cutting or other natural channel processes is avoided. TRCA may require a meander belt delineation study or fluvial geomorphology analysis to confirm that any development does not conflict with natural channel processes. |
| Regulatory Flood Plain<br>***Engineered maps may be available*** | The Regulatory Flood Plain is the approved standard used in a particular watershed to define the limit of the flood plain for regulatory purposes. Within TRCA's jurisdiction, the Regulatory Flood Plain is based on the greater of the regional storm, Hurricane Hazel, and the 100 year flood. Any development or alterations to existing structures within the Regulatory Flood Plain may introduce risk to life or property, and may not be compatible with existing natural features. TRCA's framework for Flood Plain Management is the *Valley and Stream Corridor Management Program*. TRCA may require a flood study or hydraulic update to confirm that there will be no impacts to the storage or conveyance of flood waters. |
| Wetlands | Wetlands are sensitive natural habitats that play an important role in numerous physical, chemical and biological processes, including storm water control, natural habitat and water quality improvement. Most wetlands are designated by the Ministry of Natural Resources as Provincially Significant or Locally Significant. Other wetlands have also been identified on a site specific basis by TRCA. All of these are regulated under Ontario Regulation 166/06. TRCA may require an environmental study or site confirmation of wetlands locations. |
| Watercourses<br>***Partial GIS data available*** | Typically, watercourses are associated with aquatic species and habitat. Any alteration or interference to a watercourse (e.g. straightening, diverting, realigning, altering baseflow) has the potential to impact fish communities, but may also affect the Regulatory Flood Plain, erosion or other natural channel processes. TRCA may require an environmental study or site confirmation of watercourse locations. |

| TRCA PROGRAM AND POLICY AREAS<br>*Note: Additional program and policy information may be available at www.trca.on.ca, or by request.* | |
|---|---|
| Aquatic Species and Habitat<br>***GIS data available*** | Under the *Fisheries Act*, the Harmful Alteration, Disruption or Destruction (HADD) of fish habitat is prohibited, unless authorized by Fisheries and Oceans Canada (DFO). TRCA reviews projects under the *Fisheries Act* based on our Level III Agreement with DFO to ensure that any potential impacts to fish habitat are appropriately mitigated, or that adequate compensation is provided where a HADD is unavoidable. Alternatives should be designed with appropriate mitigation measures to avoid a HADD. If a HADD is unavoidable, a suitable compensation plan must be developed, and Authorization from DFO will be required.<br><br>TRCA may require a quantification and assessment of existing conditions and proposed changes to fish habitat and communities to confirm impacts to these resources. |
| Aquifers and Hydrogeological Features | The extraction and discharge of groundwater has the potential to negatively impact surrounding natural features. Even small amounts of groundwater extraction may reduce contributions to groundwater dependent features such as wetlands, springs, or fish spawning habitat. In addition, the discharge of groundwater must be controlled to avoid impacts to watercourses and fish habitat from erosion, sedimentation and water quality concerns.<br><br>TRCA may require geotechnical or hydrogeological investigations to confirm dewatering and discharge requirements, and to identify appropriate mitigation measures with respect to potential impacts to natural features (i.e., wetlands, watercourses, natural features and aquatic habitat). |
| Archaeological and Heritage Resources | TRCA watershed strategies include recommendations for the management of archaeological and heritage resources in accordance with Ministry of Culture and Municipal standards. Preserve and protect archaeological resources where possible.<br><br>TRCA may require a Stage 1, 2, 3, or 4 archaeological assessment to confirm impacts to these resources. Note that an archaeological investigation by TRCA's archaeological staff must precede any disturbance to TRCA property, at the cost of the proponent. Scheduling will be subject to weather, seasonal programs and other field work. |
| Conservation Land (TRCA Property)<br>***GIS data available*** | If TRCA property is needed for the implementation of the preferred alternative, permission and approval from TRCA and the Minister of Natural Resources are required. The design must demonstrate that TRCA program and policy objectives are met. Formal approval typically takes 12 to 18 months from the completion of the EA document. As noted above, an archaeological investigation by TRCA's archaeological staff must precede any disturbance to TRCA property.<br><br>Applicable programs and strategies for works on TRCA property may include: *TRCA Strategy for Public Use of Authority Lands, TRCA Greenspace Strategy, Archaeological Resource Management Procedures: Guidelines*, master plans for specific conservation lands, watershed strategies, or other programs or policies referenced in this document. |
| Environmentally Significant Areas | Environmentally Significant Areas have been identified by TRCA based on a set of ecological criteria regarding the function, significance and rarity of the features or species found in the area. |
| Habitat Implementation Plans | TRCA staff has identified management opportunities for habitat restoration and enhancement on TRCA property and some privately owned lands. The Habitat Implementation Plans target priority sites to improve natural form and function based on targets in the watershed strategies.<br><br>Detailed plans have been developed or implemented for certain sites, while other locations have been identified for future work. Consultation with TRCA should take place to ensure that impacts to priority areas are avoided, or that opportunities to implement restoration plans are identified. |
| Living City Programs | The Living City is a vision adopted by TRCA for a new kind of community, where human settlement can flourish forever as part of nature's beauty and diversity. The key objectives of the Living City are: healthy rivers and shorelines; regional biodiversity; sustainable communities; and business |

| | |
|---|---|
| | excellence.<br><br>Programs associated with TRCA's Living City include: trails enhancement, renewable energy, sustainable communities, and the *Sustainable Technologies Evaluation Program* (STEP). |
| Special Policy Areas<br>***GIS data available*** | Developed areas that have historically existed within a flood plain may be designated as Special Policy Areas (SPA) as permitted under the 2005 *Provincial Policy Statement*. Policies for development and land use in these areas address the social, economic and cultural factors that support the continuation of the community. SPAs allow development and land uses that would not otherwise be permitted by the provincial policies on flood plain management. |
| Terrestrial Natural Heritage System Strategy<br>***GIS data available*** | TRCA has identified the need to improve both the quality and quantity of terrestrial habitat. TRCA's *Terrestrial Natural Heritage System Strategy* sets measurable targets for attaining a healthier natural system by creating an expanded and targeted land base. It includes strategic directions for stewardship and securement of the land base, a land use policy framework to help achieve the target system, and other implementation mechanisms. |
| Terrestrial Species and Habitat<br>***GIS data available*** | The terrestrial system includes landscape features, vegetation communities and flora and fauna species. Terrestrial species and habitat should be assessed based on their conservation status according to sensitivity to disturbance and specialized ecological needs, as well as rarity.<br><br>TRCA may require a site assessment and terrestrial inventory to confirm impacts to these resources. TRCA's *Terrestrial Natural Heritage Strategy* may be applicable to any work that impacts terrestrial species and habitat. In addition, relevant legislation (e.g. *Migratory Bird Convention Act*, *Species at Risk Act*) should be applied. |
| **PROVINCIAL AND FEDERAL PROGRAM AREAS** | |
| Areas of Natural and Scientific Interest | Areas of Natural and Scientific Interest are designated areas of land and water containing natural landscapes or features identified as having values in the life or earth sciences related to protection, scientific study or education. Contact the Ministry of Natural Resources for more details. |
| Asian Long-Horned Beetle Regulated ~~Area~~ | The Canadian Food Inspection Agency (CFIA) has established a regulated area in parts of Toronto and Vaughan to prevent the spread of the Asian Long-Horned Beetle. The *Asian Long-horned Beetle Infested Place Order* prohibits the movement of any tree materials out of or through the regulated area unless authorized by a Movement Certificate issued by the CFIA. |
| Greenbelt | The Greenbelt consists of approximately 728,000 hectares of environmentally sensitive land and agricultural land in the Golden Horseshoe. The *Greenbelt Plan* identifies limits to urbanization to provide permanent protection to the agricultural land base and the ecological features and functions occurring within this landscape. Contact the Ministry of Municipal Affairs and Housing for more details. Alternatives must conform with Section 4.2 of the *Greenbelt Plan*. |
| Oak Ridges Moraine | The Oak Ridges Moraine is an environmentally sensitive, geological landform in south central Ontario, covering 190,000 hectares. The *Oak Ridges Moraine Conservation Plan* provides land use and resource management direction for the land and water within the Moraine. Contact the Ministry of Municipal Affairs and Housing for more details.<br>Alternatives must conform with Section 41 of the *Oak Ridges Moraine Conservation Plan*. |
| Provincially Significant Wetlands | Provincially Significant Wetlands are identified by the Ministry of Natural Resources (MNR) according to a provincial evaluation guide that considers soil composition, hydrology and plant species. The 2005 *Provincial Policy Statement* states that development and site alteration shall not be permitted in these areas. Contact MNR for more details. |
| Wellhead Protection Area | Wellhead Protection Areas (WHPAs) represent potentially vulnerable zones where land use changes or infrastructure installations may affect the quality or quantity of water in the associated municipal groundwater supply well. Therefore, hydrogeologists for the Regional Municipalities of Peel, York and Durham have requested that any information on any projects within WHPAs be referred to them for their review. Similarly, TRCA's hydrogeologists require notification so that information can be incorporated into TRCA's Assessment Report. |

# Service Delivery Standards

## Recommended TRCA Contact Points in the Municipal Class EA Planning & Design Process




Please note:

This chart presents a simplification of the EA process and is not meant to replace Exhibit A.2 of the Municipal Class EA Terms of Reference

Ontario

**Ministry of Tourism and Culture**

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

# Criteria for Evaluating Archaeological Potential

## A Checklist for the Non-Specialist

"Archaeological potential" is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

| |
|---|
| Project Name |
| Project Location |
| Proponent Name |
| Proponent Contact Information |

| **Known Archaeological Sites** | **Yes** | **Unknown** | **No** |
|---|---|---|---|
| 1. Known archaeological sites within 300 m of property | ☐ | ☐ | ☐ |

| **Known Archaeological Sites** | **Yes** | **Unknown** | **No** |
|---|---|---|---|
| 2. Body of water within 300 m of property<br>If yes, what kind of water? | ☐ | ☐ | ☐ |
| a) Primary water source (lake, river, large creek, etc.) | ☐ | ☐ | ☐ |
| b) Secondary water source (stream, spring, marsh, swamp, etc.) | ☐ | ☐ | ☐ |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.) | ☐ | ☐ | ☐ |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus) | ☐ | ☐ | ☐ |
| 4. Pockets of sandy soil (50 $m^2$ or larger) in a clay or rocky area on property | ☐ | ☐ | ☐ |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc) | ☐ | ☐ | ☐ |

| **Cultural Features** | **Yes** | **Unknown** | **No** |
|---|---|---|---|
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit) | ☐ | ☐ | ☐ |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.) | ☐ | ☐ | ☐ |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc) | ☐ | ☐ | ☐ |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.) | ☐ | ☐ | ☐ |

| **Property-specific Information** | **Yes** | **Unknown** | **No** |
|---|---|---|---|
| 10. Property is designated and/or listed under the *Ontario Heritage Act*<br>(municipal register and lands described in Reg. 875 of the *Ontario Heritage Act*) | ☐ | ☐ | ☐ |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.) | ☐ | ☐ | ☐ |
| 12. Recent deep ground disturbance[†]<br>(post-1960, widespread and deep land alterations) | ☐ | ☐ | ☐ |

[†] Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

| Scoring the results: | |
|---|---|
| If **Yes** to **any** of **1**, **2a, 2b, 2c, 6, 10, or 11** | → high archaeological potential **–** assessment is required |
| If **Yes** to **two or more** of **3, 4, 5, 7, 8, or 9** | → high archaeological potential **–** assessment is required |
| If **Yes** to **12 or No** to all of **1 - 10** | → **low** archaeological potential **–** assessment is not required |
| If 3 or more **Unknown** | → an archaeological assessment is required (see note below) |

† **Note**: If information requested in this checklist is unknown, a consultant archaeologist licensed under the *Ontario Heritage Act* should be retained to carry out at least a Stage 1 archaeological assessment to further explore the archaeological potential of the property and to prepare a report on the results of that assessment. The Ministry of Tourism and Culture reviews all such reports prepared by consultant archaeologists against the ministry's Standards and Guidelines for Consultant Archaeologists. Once the ministry is satisfied that, based on the available information, the report has been prepared in accordance with those guidelines, the ministry issues an acceptance letter to the consultant archaeologist and places the report into its registry where it is available for public inspection.

FIELDGATE
DEVELOPMENTS

5400 Yonge Street, Suite 501
Toronto, ON M2N 5R5
Tel.: (416) 227-9005
Fax: (416) 227-9007

July 27, 2012

City of Vaughan
2141 Major Mackenzie Drive
Vaughan, ON
L6A 1T1

Attention: Mr. Saad Yousaf, P.Eng., PMP
Storm Drainage Engineer

Dear Mr. Yousaf:

**RE: MASTER PLANS FOR URBAN WATER INFRASTRUCTURE IN VAUGHAN**
**Storm Drainage / Storm Water Management Master Plan**

On review of the Master Plan documents as currently available we note that storm water management facilities appear to be located on land outside of the Provincial Greenbelt. This is of particular interest to our lands within Block 41. We draw your attention to the fact that the Greenbelt in this block is very land consumptive and includes a great deal of table land (otherwise-developable land) that is devoid of environmental features. It is our position that such land within the Greenbelt is suitable to accommodate storm water facilities and such facilities are a permitted use within the Greenbelt. Accordingly, we request that the Master Plan be amended to locate the proposed storm water facilities within the Provincial Greenbelt in Block 41.

Thank you for your attention to this matter. As always, we would be pleased to have our consulting team join us in a meeting with you and your consultants to discuss any questions you may have. Please ensure that we are on your circulation list for future communications and advise us in advance of any further meetings with respect to the plan or of any consideration by Council.

Yours very truly,
**FIELDGATE DEVELOPMENTS**

Rick Mangotich
Vice President

RM:mh

COLE ENGINEERING

*Experience Enhancing Excellence*

August 9, 2012
Our Ref: W11-259

Fieldgate Developments
5400 Yonge Street, Suite 501
Toronto, ON M2N 5R5

**Attention: Rick Mangotich**
**Vice President**

Dear Mr. Mangotich:

**Re: Master Plans for Urban Water Infrastructure in the City of Vaughan**
**Storm Drainage / Storm Water Management Master Plan**

Thank you for your reply dated July 27, 2012. The Storm Drainage / Storm Water Management Master Plan is intended to be a guiding document for the development community. The preferred SWM strategy has been determined through the Environmental Assessment (EA) process considering different alternatives to service future growth areas and intensification / infill developments within the City of Vaughan (the City). The proposed Stormwater Management (SWM) strategy for Block 41 includes centralized end of pipe SWM facilities for quantity control, quality control and water balance / erosion control.

We appreciate that the proposed SWM ponds if located outside the Green belt within the Block would occupy otherwise developable land. At this point in the planning process, the pond block sizes and locations are conceptual. Prior to the finalization of any proposed SWM facility, any proposed development would need to follow the planning process which in this case would be Secondary Plan Approval followed by Block Plan Approval. Additionally studies will also need to be completed which may influence proposed pond sizes and locations. These include (but not limited to) the current SWM Master Plan as well as the Natural Heritage Network Study which the City is currently undertaking where the goal is to identify core areas, ecological linkages and enhancement areas that collectively provide long-term ecological integrity to protect native biodiversity. The outcome of these studies may influence pond sizes and locations.

We are currently in the early stages of the planning process therefore all pond locations and sizes are conceptual at this point and will require refinement through detailed studies undertaken by the development community. Please let contact the undersigned if you have any additional questions or concerns.

Yours truly,

**COLE ENGINEERING GROUP LTD.**

Geoff Masotti, P.Eng.
Project Manager

AH:kb

c.: Edward Graham, M.A.Sc., P.Eng.
Saad Yousaf, P.Eng., PMP, Storm Drainage Engineer

July 31, 2013 CFN **46410**

**BY MAIL AND EMAIL** (Michael.frieri@vaughaninfrastructure.ca)

Mr. Michael Frieri, C.E.T.
Manager of Engineering Planning and Studies
Development/Transportation Engineering Department
City of Vaughan
2141 Major Mackenzie Drive
Vaughan, Ontario
L6A 1T1

Dear Mr. Frieri:

**Re: Response to Draft Master Plan**
**City-Wide Storm Drainage/Storm Water Management Master Plan**
**Humber and Don River Watersheds; City of Vaughan; Regional Municipality of York**

Toronto and Region Conservation Authority (TRCA) staff received the draft Stormwater Management Master Plan, Environmental Assessment (EA) on March 26, 2013. It is our understanding that this undertaking involves a city wide master plan study for the storm drainage and storm water management for the City of Vaughan that will evaluate the use of alternative SWM practices for effective treatment of stormwater from source, conveyance and end of pipe controls to promote protection of the natural environmental systems.

Staff has completed their review and provides comments in Appendix A. The final EA document should be accompanied by a covering letter which uses the numbering scheme provided in this letter and identifies how these comments have been addressed. Please ensure TRCA receives a copy of the Notice of Study Completion, as well as one (1) hard copy and one (1) digital copy of the final **Report**. Digital materials must be submitted in PDF format, with drawings pre-scaled to print on 11"x17" pages. Materials may be submitted on discs, via e-mail (if less than 2.5 MB), or through file transfer protocol (FTP) sites (if posted for a minimum of two weeks).

Should you have any questions please contact me at extension 5759 or at **sbevan**@trca.on.ca.

Yours truly,

Suzanne Bevan

**Suzanne Bevan**
Senior Planner, Environmental Assessment Planning
Planning and Development

**BY EMAIL**

| | |
|---|---|
| City of Vaugan: | Saad Yousaf (Saad.Yousaf@vaughan.ca) |
| Consultant: | Edward Graham, Cole Engineering Group Limited (swmmp@vaughaninfrastructure.ca) |
| TRCA: | Arlen Leeming, Project Manager, Don Watershed |
| | Vicky McGrath, Humber Watershed Specialist |
| | Carolyn Woodland, Director, Planning and Development |
| | Beth Williston, Senior Manager, Environmental Assessments |
| | June Little, Manager, Development, Planning and Regulation |
| | Sameer Dhalla, Senior Manager, Water Resource Engineering |

**Appendix A**

| # | TRCA Comments (July 31, 2013) | Response |
|---|---|---|
| **Water Resource Engineer** | | |
| Volume I | | |
| 1. | The Functional Stormwater Management Plans prepared for the various development areas will be reviewed in detail when detailed submissions are provided during the development process. Please ensure that this document provides the current TRCA criteria with the caveat that updated modeling and or criteria will be applied when the parcels move forward with development.<br><br>Please note that all maps showing the location of future swm facilities should include a qualifier that the location is approximate and subject to all other relevant legislation and location criteria. | |
| 2. | a) Section 1.4.3 – Please confirm that the criteria shown here are in line with the latest Vaughan Metropolitan Centre Master Plan updates, as the second bullet should state "Retention of 15mm rainfall over the building footprint *and landscaped areas*".<br><br>b) Section 1.6.1.1 – Please note that the TRCA Stormwater Management Criteria are no longer labelled Draft. Please update the entire report to reflect approved status of the criteria.<br><br>c) Section 1.6.1.1, Bullet 1 – Please update the bullet to specifically include the potential need for Regional Storm controls. | |
| 3. | a) Section 3.2.13, Bullet 1 – The report states that post-development peak flow rates will be controlled to pre-development. Please reference the TRCA SWM Criteria document, where for the Don River Watershed, there are unit release rates for stormwater management facilities that must be met. Please update the report.<br><br>b) Section 3.2.13, Bullet 4 – The report states that the City's IDF data will be used for the analysis. Please specify for which analyses the IDF data will be used, as the curves may not match the TRCA rainfall data for the stormwater management facility and subwatershed analysis.<br><br>c) Section 3.2.4 – Flood Vulnerable Areas are acknowledged as a natural hazard, however they do not appear on Figure 3.1 Natural Hazard Areas and Constraints. Please revise accordingly. | |
| 4. | Section 6.3 –The methodology provided appears to address peak flows for the sites only. It is unclear how water balance and downstream erosion will be considered using modeling practices. Please incorporate these factors in with the overall analysis for the various Secondary Plans. | |
| 5. | a) Section 7 – The section discusses the 3 basic approaches (Do Nothing, Source Controls, and End-of-Pipe), but does not discuss an option considering both Source Controls and End-of-pipe options. Please elaborate on why a treatment train option is necessary. In addition, please enhance all discussions related to the proposed Alternatives to discuss the impacts to the water balance.<br><br>b) Section 7.1.3 – Please state that the End-of-pipe solutions are not preferred methods for addressing the water balance criteria. | |

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| | c) Section 7.2 – For areas where development will be discharging directly to the main branches of the Humber River, TRCA's watershed modeling has shown that providing quantity control of stormwater runoff will worsen the flooding situation downstream. As a portion of the area is within an SPA and prone to flooding, TRCA disagrees with the statements that "lack of existing SWM controls exacerbates the flooding risks to these properties" as the geographic location of these properties is the reason for the flooding. Please consider re-wording this statement, and further in the section revise the requirement for quantity control for only areas where appropriate as per TRCA criteria and watershed modeling. For all Secondary Plan areas, please confirm release rates against the TRCA criteria. | |
| 6. | a) Section 8.1.1.4 – For sites where soils have slower infiltration rates, such as the clay loam for this site, please state that infiltration practices should still be investigated at subsequent design stages based on detailed borehole data, and please do not automatically remove infiltration practices from possible future SWM strategies at this stage.<br><br>b) Section 8.1.2.5 – This section outlines studies required in SPA. Please note that the studies required will be site specific and requested at the time of the application.<br><br>c) Section 8.1.3.4, Erosion – The statement in the report "Typically where SWM ponds are proposed, water balance and erosion mitigation can be accounted for through the extended detention component of the facility" is incorrect, as the SWM pond does not provide a water balance function, and erosion is only mitigated from a peak flow perspective, not a volume or hydrologic timing perspective. Stormwater management facilities treat peak flow rates, but do not improve the increase in runoff volumes from development, an impact on erosiveness and water balance. Please update the statement to reflect this.<br><br>i) Please provide further discussion, quantified justification, and modeling output to validate the statement that providing a minimum of 5mm on-site retention will negate the requirement for end-of-pipe erosion analysis for Rainbow Creek. What is the requirement for the rest of the City?<br><br>d) Section 8.1.3.5 – Please add percolation and hydrogeological water budget analysis to the Recommended Studies requirement for all study areas. In addition, please emphasise that the "Recommended Studies" are engineering only based, and that others (natural heritage, etc) may be required in addition.<br><br>e) Section 8.1.4.2 – Please revise the wording for the first recommended study to read "ecological study of the watercourses west of Huntington Road to determine the corridor size and volume of drainage to be maintained"<br><br>f) Section 8.2.2, 7th paragraph – As stated in an earlier comment, please do not automatically preclude infiltration techniques based on a high level conceptual analysis, and defer final at source/lot level facilities to subsequent design phases. Please note that a long term stormwater management plan for the Garden Centre will be required.<br><br>g) Section 8.2.5 - Please clarify why the hospital site is subject to different storm event criteria. | |
| 7. | Section 10.1 – Please include the need for detailed water budget analysis as part of large block plan water balance analyses. | |

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| 8. | Section 14 – What are the impacts associated with the August 19 2005 storm on several stormwater management facilities within the City, and how did they react? Please consider broadening the spectrum of the analysis to include all stormwater elements, including conveyance systems and swm facilities in addition to road pondings. Finally, what implications would ponded intersections have on emergency response vehicles, as Vaughan's policy is that emergency vehicles are not to enter flooded areas. Where would access be limited within the City? | |
| Volume 3 | | |
| 9. | Section 4.1 Quantity Control Model, page 10<br><br>"As Rainbow Creek is part of the Humber River Watershed any changes to the quantity control requirements for Rainbow Creek would have to be evaluated in terms of (their) effect on the Humber River."<br><br>Staff agrees with this statement, as it was partially the rationale for TRCA initiating the study titled: Hydrologic Study of Impacts on Flood Flows and Mitigation of Future Development in Humber River-draft (AMEC, 2012) which was referenced in this report on page 5. The scope of that report included investigating the effects of increases in flows in the Humber River and its tributaries as a whole. This included analyzing the effects of timing changes due to increases in imperviousness upstream as a result of new development. The recommendations from that report based this analysis. An analysis of the Rainbow Creek in isolation would not reflect these impacts. This was stated as being "out of scope" in this study. TRCA would caution that as these potential effects have been identified, Vaughan may be exposing itself to future legal liability if future damages were to occur downstream due to these cumulative impacts not being taken into account. | |
| 10. | Section 6.0 Conclusions and Recommendations, page 34<br><br>"It is recommended that no regional controls be required for developments within the Vaughan portion of the Rainbow Creek Sub-watershed"<br><br>The report indicates many locations with an increase in regional storm flows for the 2051 scenario up to 7.7% (23.6 cms). TRCA considers these increases as significant, and recommends that management and mitigation options consistent with those outlined in the preliminary report. TRCA would caution the City of Vaughan that they could be potentially exposing themselves to future liability if these recommendations are not taken into account. | |
| **Ecology** | | |
| Volume 1 | | |
| 11. | Staff notes that this report is very high level and does include much detail on the natural environment, associated constraints or opportunities.<br><br>a) The range of solutions should include a treatment train approach, such that lot level/at source/conveyance controls AND end of pipe measure is considered as an option.<br><br>b) It is suggested that a section be added to the report, which indicates all relevant environmental policies of the day will be adhered to. For example, TRCA's Valley and Stream policies may be updated when these SWM strategies are implemented, and the report should recognize that the existing policies of the day are to be followed. This is particularly true for siting of SWM infrastructure. In addition, consultation with the Ministry of Natural Resources should be included, as additional species may be uplisted as Endangered, and may result in additional approvals for SWM infrastructure or discharge of flows to receiving watercourses. | |

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| | c) The report should include more detail related to environmental constraints and opportunities (i.e. aquatic sensitivities, watercourse classifications, aquatic habitats, etc.) as these factors may result in constraints during more detailed study, such as the recommended EIS for each area. It may be beneficial to identify some of these constraints now, so that appropriate study is completed at later stages. Some of this information could be obtained from existing literature, such as the Humber River Watershed Plan, Humber River Fisheries Plan, etc.<br><br>d) Please explain how the alternatives were analysed with respect to environmental constraints and opportunities when the environmental data was not included in the report.<br><br>e) It is understood that the City is completing a Natural Heritage Network Study to further characterize the existing natural heritage network. Please confirm that this detailed ecological information is used in future SWM planning.<br><br>f) Quality control should include thermal impacts and potential mitigation, as many of the watercourses in the City are currently classified as cool and cold water streams. | |
| 12. | a) Figures such as Figure 1-3 should be labeled as “schematic” or “conceptual” as the limits of the natural heritage system have not yet been established at the site/block level.<br><br>b) Staff notes that Section 1.6.1.1 should highlight both aspects of water balance within the SWM Guideline document – specifically the potential need (site specific) for a feature based water balance to maintain natural heritage features and functions.<br><br>c) Section 3.2.6 should speak to more than just Redside Dace habitat. Fisheries management plans and Watershed plans should be referenced.<br><br>d) Figure 3-1 should include Vaughan’s Natural Heritage Network, identify sources for these layers, and ensure legend identifies all lines shown.<br><br>e) Section 3.4.5 should reference TRCA’s Watershed plans, not just subwatershed plans. The existing condition of Vaughan’s watercourses would be useful in this section, particularly for reaches that have been subject to significant hydrologic change due to past swm practices. The Erosion Study identified at the end of the document is supported, but would seem to have been most useful as a background study to support future stormwater management planning at a high level.<br><br>f) Section 4 is “Evaluation of the Cumulative Environmental Impact of Stormwater” but appears to be more an assessment of future needs. Is a section discussing the cumulative impacts missing from or intended for this document? As noted above, an assessment of the state of our watersheds based on past practices would be informative.<br><br>g) Section 5.2.2: Reduction of the total impervious surface area should also be an option. This speaks to the need to consider SWM objectives early in the planning process to ensure site designs can meet the necessary targets for protection of natural resources, flooding etc.<br><br>h) Section 5.2.3 should identify some of the limitations of wet ponds as well, including | |

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| | maintenance issues, thermal warming etc.<br><br>i) Section 6.2 should speak to Low Impact Development strategies, and should include discussion about opportunities to implement at source controls at not just the lot level, but perhaps at the "multi-lot level", incorporation open space/parkland areas into the overall swm strategy. As development moves into headwater areas, this approach will be necessary to protect the natural heritage system, fish and fish habitat and municipal infrastructure, and future development itself.<br><br>j) Staff suggests that "opportunity" be replaced with "ability" in Table 6-1, as all elements being evaluated are opportunities.<br><br>k) Section 7.2: Please confirm why conveyance controls are not included in this discussion.<br><br>l) Section 8: Opportunities to improve upon the "existing" conditions should be considered, especially where the existing condition may already be contributing to the degradation of our natural heritage systems and watercourses, and threatening existing downstream infrastructure. Re-development should be designed to include opportunities for retrofits to manage the existing condition to allow for improvements in the long-term. | |
| Volume 2 | | |
| 13. | The need for feature based water balance work should be identified for Block 27, and other areas proposed for new development. Figures and details should clearly identify areas where landuse planning decisions (ie. secondary plans, plan of subdivision), and therefor extent of imperviousness, natural heritage systems etc., have not been finalized. These figures should be identified as "concept" only, and assumptions made to allow for high-level consideration only, and in no way is intended to direct or supersede proper planning for these areas. | |
| **Hydrogeology** | | |
| 14. | There is no hydrogeology related information available in the above mentioned report for review. That said, this high level planning report identifies future stormwater management strategies in respect of different secondary plan areas. Hydrogeology related issues with SWM ponds are mostly related to a liner requirement. Please note that staff will provide comments when these reports are made available. | |

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June 27, 2014
Our Ref: W11-259

Toronto and Region Conservation Authority
Environmental Assessment Planning
Planning and Development
5 Shoreham Drive
Downsview, ON M3N 1S4

**Attention: Suzanne Bevan**
**Senior Planner**

Dear Ms. Bevan:

**Re: City of Vaughan**
**Stormwater Management Master Plan and Municipal Class Environmental Assessment**
**Response to Comments dated July 31st, 2013**

Cole Engineering Group Ltd. (Cole Engineering) would like to thank the Toronto and Region Conservation Authority (TRCA) for their comments and participation in the preparation of the City of Vaughan Stormwater Management Master Plan and Municipal Class Environmental Assessment. Further to our ongoing discussions and meetings on this project, we have now completed the Master Plan document and are circulating the final report. We are pleased to provide the enclosed final report along with the following summary to address your comments in the letter dated July 31, 2013. Below are our responses to your itemized comments on the draft report which are shown in *italics*.

1. *The Functional Stormwater Management Plans prepared for the various development areas will be reviewed in detail when detailed submissions are provided during the development process. Please ensure that this document provides the current TRCA criteria with the caveat that updated modeling and or criteria will be applied when the parcels move forward with development. Please note that all maps showing the location of future SWM facilities should include a qualifier that the location is approximate and subject to all other relevant legislation and location criteria.*

**Noted. Section 1.0 in Volume 2 has been revised to specify that updated modeling is required, and that the most current TRCA criteria will apply as the parcels move forward through the development process. Figures and drawings have been updated to include a qualifier that the locations of proposed SWM facilities are approximate at this stage.**

2. *a) Section 1.4.3 – Please confirm that the criteria shown here are in line with the latest Vaughan Metropolitan Centre Master Plan updates, as the second bullet should state "Retention of 15mm rainfall over the building footprint and landscaped areas".*

2. *b) Section 1.6.1.1 – Please note that the TRCA Stormwater Management Criteria are no longer labelled Draft. Please update the entire report to reflect approved status of the criteria.*

2. *c) Section 1.6.1.1, Bullet 1 – Please update the bullet to specifically include the potential need for Regional Storm controls.*

**The report has been revised as requested.**

3. *a) Section 3.2.13, Bullet 1 – The report states that post-development peak flow rates will be controlled to pre-development. Please reference the TRCA SWM Criteria document, where for the Don River Watershed, there are unit release rates for stormwater management facilities that must be met. Please update the report.*

**The report has been revised to include "or unit flow rates specified for certain tributaries of the Don and Humber River watersheds".**

3. *b) Section 3.2.13, Bullet 4 – The report states that the City's IDF data will be used for the analysis. Please specify for which analyses the IDF data will be used, as the curves may not match the TRCA rainfall data for the stormwater management facility and subwatershed analysis.*

**Reference to City IDF data has been removed as the SWM Plans will be required to use the appropriate Subwatershed storm data.**

3. *c) Section 3.2.4 – Flood Vulnerable Areas are acknowledged as a natural hazard, however they do not appear on Figure 3.1 Natural Hazard Areas and Constraints. Please revise accordingly.*

**Figure 3-1 has been revised to include flood vulnerable areas as part of the natural hazard areas and constraints.**

4. *Section 6.3 –The methodology provided appears to address peak flows for the sites only. It is unclear how water balance and downstream erosion will be considered using modeling practices. Please incorporate these factors in with the overall analysis for the various Secondary Plans.*

**Detailed modeling to determine erosion and water balance targets will be determined during subsequent development stages.**

5. *a) Section 7 – The section discusses the 3 basic approaches (Do Nothing, Source Controls, and End-of-Pipe), but does not discuss an option considering both Source Controls and End-of-pipe options. Please elaborate on why a treatment train option is necessary. In addition, please enhance all discussions related to the proposed Alternatives to discuss the impacts to the water balance.*

**The option of combining end-of-pipe and at source / conveyance controls was considered in areas where the proposed would allow it. Discussions have been enhanced to emphasize the importance of preserving water balance for future development sites.**

5. *b) Section 7.1.3 – Please state that the End-of-pipe solutions are not preferred methods for addressing the water balance criteria.*

**This statement has been added to the report.**

5. *c) Section 7.2 – For areas where development will be discharging directly to the main branches of the Humber River, TRCA's watershed modeling has shown that providing quantity control of stormwater runoff will worsen the flooding situation downstream. As a portion of the area is within an SPA and prone to flooding, TRCA disagrees with the statements that "lack of existing SWM controls exacerbates the flooding risks to these properties" as the geographic location of these properties is the reason for the flooding. Please consider re-wording this statement, and further in the section revise the requirement for quantity control for only areas where appropriate as per TRCA criteria and watershed modeling. For all Secondary Plan areas, please confirm release rates against the TRCA criteria.*

**Statements that "lack of existing SWM controls exacerbates the flooding risks to these properties" have been removed. Volume 1 has been revised to reflect the no quantity control requirement of this branch of the Humber River. Volume 2 has been reviewed and revised where necessary to reflect the TRCA's criteria for stormwater management. A statement has been added to Section 5.2 in the Woodbridge Core Functional SWM Plan noting that flow attenuation may be required based on the limitations or capacity constraints of the receiving infrastructure.**

6. *a) Section 8.1.1.4 – For sites where soils have slower infiltration rates, such as the clay loam for this site, please state that infiltration practices should still be investigated at subsequent design stages based on detailed borehole data, and please do not automatically remove infiltration practices from possible future SWM strategies at this stage.*

**The relevant sections have been revised to not remove infiltration practices from possible future SWM strategies.**

6. *b) Section 8.1.2.5 – This section outlines studies required in SPA. Please note that the studies required will be site specific and requested at the time of the application.*

**The section has been modified to note the site-specific nature of each of the study.**

6. *c) Section 8.1.3.4, Erosion – The statement in the report "Typically where SWM ponds are proposed, water balance and erosion mitigation can be accounted for through the extended detention component of the facility" is incorrect, as the SWM pond does not provide a water balance function, and erosion is only mitigated from a peak flow perspective, not a volume or hydrologic timing perspective. Stormwater management facilities treat peak flow rates, but do not improve the increase in runoff volumes from development, an impact on erosiveness and water balance. Please update the statement to reflect this.*

**This section has been revised to specify peak flow erosion mitigation that SWM ponds provide. A statement added to specify that extended detention does not provide erosion mitigation with respect to volume and hydrologic timing. The water balance statement has been removed from the erosion section.**

6. *c-i) Please provide further discussion, quantified justification, and modeling output to validate the statement that providing a minimum of 5 mm on-site retention will negate the requirement for end-of-pipe erosion analysis for Rainbow Creek. What is the requirement for the rest of the City?*

**This section has been revised to add a reference to Volume 3 of the report, which discusses the recommended erosion criteria for Rainbow Creek. The EA has recommended additional erosion studies throughout the City to verify erosion criteria requirements. In the absence of these studies, additional analyses will be required through later planning stages in support of future development applications.**

6. *d) Section 8.1.3.5 – Please add percolation and hydrogeological water budget analysis to the Recommended Studies requirement for all study areas. In addition, please emphasise that the "Recommended Studies" are engineering only based, and that others (natural heritage, etc) may be required in addition.*

**The relevant sections have been revised to include the percolation and hydrogeological water budget analyses. Emphasis has been added to note that recommended studies are engineering-based and that additional studies may be required.**

6. *e) Section 8.1.4.2 – Please revise the wording for the first recommended study to read "ecological study of the watercourses west of Huntington Road to determine the corridor size and volume of drainage to be maintained".*

**This statement has been revised as recommended.**

6. *f) Section 8.2.2, 7th paragraph – As stated in an earlier comment, please do not automatically preclude infiltration techniques based on a high level conceptual analysis, and defer final at source / lot level facilities to subsequent design phases. Please note that a long term stormwater management plan for the Garden Centre will be required.*

**Revisions have been made throughout the report to specify that the feasibility of infiltration-based controls is to be confirmed through geotechnical investigations as part of future studies.**

6. *g) Section 8.2.5 – Please clarify why the hospital site is subject to different storm event criteria.*

**The criteria in this section have been revised to remain consistent with TRCA and City of Vaughan criteria.**

7. *Section 10.1 – Please include the need for detailed water budget analysis as part of large block plan water balance analyses.*

**The section has been revised as suggested.**

8. *Section 14 – What are the impacts associated with the August 19 2005 storm on several stormwater management facilities within the City, and how did they react? Please consider broadening the spectrum of the analysis to include all stormwater elements, including conveyance systems and SWM facilities in addition to road pondings. Finally, what implications would ponded intersections have on emergency response vehicles, as Vaughan's policy is that emergency vehicles are not to enter flooded areas. Where would access be limited within the City?*

**The City wishes to limit the scope of the climate change adaptations to evaluate their current road drainage design criteria to determine if the August 19, 2005 storm generally can be conveyed. The City will be taking the recommendations of this report and looking at the need for further adaptations in other studies outside of the scope of this EA.**

9. *Section 4.1 Quantity Control Model, page 10: "As Rainbow Creek is part of the Humber River Watershed any changes to the quantity control requirements for Rainbow Creek would have to be evaluated in terms of (their) effect on the Humber River". Staff agrees with this statement, as it was partially the rationale for TRCA initiating the study titled: Hydrologic Study of Impacts on Flood Flows and Mitigation of Future Development in Humber River-draft (AMEC, 2012) which was referenced in this report on page 5. The scope of that report included investigating the effects of increases in flows in the Humber River and its tributaries as a whole. This included analyzing the effects of timing changes due to increases in imperviousness upstream as a result of new development. The recommendations from that report based this analysis. An analysis of the Rainbow Creek in isolation would not reflect these impacts. This was stated as being "out of scope" in this study. TRCA would caution that as these potential effects have been identified, Vaughan may be exposing itself to future legal liability if future damages were to occur downstream due to these cumulative impacts not being taken into account.*

**The City acknowledges these potential risks at this time and will continue to consider the potential impacts outside of the Rainbow Creek Study area once presented with data that demonstrates an increase in flood risk. As per the ongoing discussions on this issue, the analysis completed as part of this project did not reflect a marked increased in flood risk and/or proposed mitigation strategies to facilitate the proposed growth. Once the TRCA has completed the larger Humber River Study, the issue may be reopened for further discussion and the potential need for an addendum should it be demonstrated that there is a marked increase in flood risk.**

10. *Section 6.0 Conclusions and Recommendations, page 34: "It is recommended that no regional controls be required for developments within the Vaughan portion of the Rainbow Creek Sub-watershed". The report indicates many locations with an increase in regional storm flows for the 2051 scenario up to 7.7% (23.6 cms). TRCA considers these increases as significant, and recommends that management and mitigation options consistent with those outlined in the preliminary report. TRCA would caution the City of Vaughan that they could be potentially exposing themselves to future liability if these recommendations are not taken into account.*

**The City acknowledges these potential risks at this time and will continue to consider the potential impacts outside of the Rainbow Creek Study area once presented with data that demonstrates an increase in flood risk. As per the ongoing discussions on this issue, the analysis completed as part of this project did not reflect a marked increased in flood risk and/or proposed mitigation strategies to facilitate the proposed growth including culvert improvements. Once the TRCA has completed the larger Humber River Study, the issue may be reopened for further discussion and the potential need for an addendum should it be demonstrated that there is a marked increase in flood risk.**

11. *Staff notes that this report is very high level and does include much detail on the natural environment, associated constraints or opportunities.*

**Noted. This EA is focused on the engineering and infrastructure requirements with regards to stormwater management. The City is undertaking other studies to address the Natural Heritage Network. Statements have been made in Section 3.2 to note that the latest policies relating to the City's Natural Heritage Network, Ontario's Green Belt, Oak Ridges Moraine, Environmentally Significant Areas, and aquatic habitat – including policies contained within the Humber River Watershed Plan, the Don River Watershed Plan, and the Ontario's Endangered Species Act – are all to be respected through the development process. As such, this EA has limited the environmental discussion to the relevant issues related to the preferred SWM infrastructure selection.**

**Furthermore, further planning and engineering studies in support of the proposed developments will be required to address the constraints and opportunities based on much more detailed work as per the existing planning and development process (i.e. MESP, FSR, etc.).**

11. *a) The range of solutions should include a treatment train approach, such that lot level / at source / conveyance controls AND end of pipe measure is considered as an option.*

**As per Comment 5(a) above – the option of combining end-of-pipe and at source/conveyance controls was considered in areas where the proposed would allow it.**

11. *b) It is suggested that a section be added to the report, which indicates all relevant environmental policies of the day will be adhered to. For example, TRCA's Valley and Stream policies may be updated when these SWM strategies are implemented, and the report should recognize that the existing policies of the day are to be followed. This is particularly true for siting of SWM infrastructure. In addition, consultation with the Ministry of Natural Resources should be included, as additional species may be uplisted as Endangered, and may result in additional approvals for SWM infrastructure or discharge of flows to receiving watercourses.*

11. *c) The report should include more detail related to environmental constraints and opportunities (i.e. aquatic sensitivities, watercourse classifications, aquatic habitats, etc.) as these factors may result in constraints during more detailed study, such as the recommended EIS for each area. It may be beneficial to identify some of these constraints now, so that appropriate study is completed at later stages. Some of this information could be obtained from existing literature, such as the Humber River Watershed Plan, Humber River Fisheries Plan, etc.*

11. *d) Please explain how the alternatives were analysed with respect to environmental constraints and opportunities when the environmental data was not included in the report.*

11. *e) It is understood that the City is completing a Natural Heritage Network Study to further characterize the existing natural heritage network. Please confirm that this detailed ecological information is used in future SWM planning.*

**As per comment 11 above, the City is currently undertaking other studies to address the relevant environmental policies regarding the City's Natural Heritage Network. Statements have been made in Section 3.2 to note that the latest policies relating to the City's Natural Heritage Network, Ontario's Green Belt, Oak Ridges Moraine, Environmentally Significant Areas, and aquatic habitat – including policies contained within the Humber River Watershed Plan, the Don River Watershed Plan, and the Ontario's Endangered Species Act – are all to be respected through the development process. As such, this EA has limited the environmental discussion to issues specific to the preferred stormwater management infrastructure selection. Furthermore, further planning and engineering studies in support of the proposed developments will be required to address the constraints and opportunities based on much more detailed work as per the existing planning and development process (i.e. MESP, FSR, etc.).**

11. *f) Quality control should include thermal impacts and potential mitigation, as many of the watercourses in the City are currently classified as cool and cold water streams.*

**The study has recommended thermal mitigation where proposed SWM facilities discharge to cool and cold water streams (Section 5.2.3).**

12. *a) Figures such as Figure 1-3 should be labelled as "schematic" or "conceptual" as the limits of the natural heritage system have not yet been established at the site / block level.*

**Figure 1-3 and other applicable figures have been updated to reiterate the conceptual nature of the Natural Heritage System limits shown.**

12. *b) Staff notes that Section 1.6.1.1 should highlight both aspects of water balance within the SWM Guideline document – specifically the potential need (site specific) for a feature based water balance to maintain natural heritage features and functions.*

**The list has been revised to specify both types of water balance objectives – groundwater recharge and natural features protection. These will be evaluated further at later planning stages as development applications are received.**

12. *c) Section 3.2.6 should speak to more than just Redside Dace habitat. Fisheries management plans and Watershed plans should be referenced.*

**Reference to the applicable watershed plans have been added to the section.**

12. *d) Figure 3-1 should include Vaughan's Natural Heritage Network, identify sources for these layers, and ensure legend identifies all lines shown.*

**Figure 3-1 has been revised to identify that natural areas shown reflect the core natural features of the City of Vaughan Natural Heritage Network.**

12. *e) Section 3.4.5 should reference TRCA's Watershed plans, not just subwatershed plans. The existing condition of Vaughan's watercourses would be useful in this section, particularly for reaches that have been subject to significant hydrologic change due to past SWM practices. The Erosion Study identified at the end of the document is supported, but would seem to have been most useful as a background study to support future stormwater management planning at a high level.*

**The section has been revised to reference the TRCA's watershed plans. The erosion study comment is noted.**

12. *f) Section 4 is "Evaluation of the Cumulative Environmental Impact of Stormwater" but appears to be more an assessment of future needs. Is a section discussing the cumulative impacts missing from or intended for this document? As noted above, an assessment of the state of our watersheds based on past practices would be informative.*

**Section had been titled incorrectly. The section is meant to compare and discuss the existing land use within the City of Vaughan, to the expected future land use. The title has been revised to better reflect items discussed.**

12. *g) Section 5.2.2: Reduction of the total impervious surface area should also be an option. This speaks to the need to consider SWM objectives early in the planning process to ensure site designs can meet the necessary targets for protection of natural resources, flooding etc.*

**The areas analyzed are generally greenfield developments and planned areas of intensification. Reducing impervious areas may not meet the intended planning objectives for the various secondary plan areas. This EA has evaluated the potential impact of the intended or zoned land use – as per the City's Official Plan and Design Standards, in order to ensure that the preferred SWM infrastructure selection will meet the target SWM criteria. All of the SWM strategies recommended as part of this study will be verified as development proceeds in the future.**

12. *h) Section 5.2.3 should identify some of the limitations of wet ponds as well, including maintenance issues, thermal warming etc.*

**Thermal impacts of wet ponds and mitigation strategies have been added to this section. Additional statements have also been added to note that proper and regular maintenance and inspections are required to ensure that wet ponds function as designed.**

12. *i) Section 6.2 should speak to Low Impact Development strategies, and should include discussion about opportunities to implement at source controls at not just the lot level, but perhaps at the "multi-lot level", incorporation open space / parkland areas into the overall SWM strategy. As development moves into headwater areas, this approach will be necessary to protect the natural heritage system, fish and fish habitat and municipal infrastructure, and future development itself.*

**The applicability of LIDs in specific areas were analysed in further depth in Volume 2. Among other things, the analyses took into consideration location, soils present, existing and proposed land use, etc. Opportunities to incorporate open space and parkland areas into the overall SWM strategy were discussed for the different areas in Volume 2. Also it is important to note that much of these ecological issues will be addressed in detail in later studies as required per the existing planning and development process (i.e. MESP, EIS, FSR, etc.).**

12. *j) Staff suggests that "opportunity" be replaced with "ability" in Table 6-1, as all elements being evaluated are opportunities.*

**Table 6-1 has been revised as suggested.**

12. *k) Section 7.2: Please confirm why conveyance controls are not included in this discussion.*

**This section has been revised to discuss conveyance controls.**

12. *l) Section 8: Opportunities to improve upon the "existing" conditions should be considered, especially where the existing condition may already be contributing to the degradation of our natural heritage systems and watercourses, and threatening existing downstream infrastructure. Re-development should be designed to include opportunities for retrofits to manage the existing condition to allow for improvements in the long-term.*

**The intent of this document was to identify the SWM infrastructure needs to support the proposed growth strategy as per the City's OPA. The City is currently investigating various locations within the City through separate study and investigation work where there may be degradation of our natural heritage systems and watercourses, and threatening existing downstream infrastructure. This opportunity would not meet the growth objectives of the City or the EA and are not being considered within the scope of this study.**

13. *The need for feature based water balance work should be identified for Block 27, and other areas proposed for new development. Figures and details should clearly identify areas where land use planning decisions (i.e. secondary plans, plan of subdivision), and therefore extent of imperviousness, natural heritage systems etc., have not been finalized. These figures should be identified as "concept" only, and assumptions made to allow for high-level consideration only, and in no way is intended to direct or supersede proper planning for these areas*

**Reference to applicable watershed plans has been added where suitable. A note has been added to the figures to note that the location of proposed SWM facilities are conceptual only and may change as a result of in the future development form. Figures shown in this section also include a conceptual "New Community Area" land use for the whole block, as per the City of Vaughan's Official Plan.**

**Several references have been made in the text to qualify that the current plans for Block 27 has not been finalized and may change in the future. The section also notes that the assumptions made in this study may no longer hold true in the future as the development process for the Block moves forward.**

14. There is no hydrogeology related information available in the above mentioned report for review. That said, this high level planning report identifies future stormwater management strategies in respect of different secondary plan areas. Hydrogeology related issues with SWM ponds are mostly related to a liner requirement. Please note that staff will provide comments when these reports are made available.

**Noted.**

We trust that with these revisions meet with the satisfaction of the TRCA. As indicated, we have attached a copy of the final report of the City of Vaughan Stormwater Management Master Plan and Municipal Class Environmental Assessment. You should receive a notice of project completion shortly. Should you have any further questions, please contact the undersigned.

Yours truly,

**COLE ENGINEERING GROUP LTD.**

Geoff Masotti, P. Eng.
Project Manager

GM:ba:kb

c. Saad Yousaf, City of Vaughan (email only)
Michael Frieri, City of Vaughan (email only)
Andrew Pearce, City of Vaughan (email only)

Encl. City of Vaughan Stormwater Management Master Plan and Municipal Class Environmental Assessment

# APPENDIX C-7
# Notice Of Completion

**NOTICE OF STUDY COMPLETION**
**CITY-WIDE STORMWATER MANAGEMENT MASTER PLAN**

**STUDY BACKGROUND**

The City of Vaughan has prepared a Master Plan to direct the ongoing development of the City's stormwater infrastructure systems that support our communities. The Master Plan will support the City's Official Plan and has considered the vision for Vaughan to the year 2031 with sustainability as a key underlying theme.

**PROCESS**

The Study has been undertaken in accordance with the requirements for Master Plans as outlined in Section A.2.7 (Approach 1 in Appendix 4) of the Municipal Engineer's Association Municipal Class Environmental Assessment document.

The Master Plan has defined existing problems and opportunities, considered and evaluated solutions and identified preferred stormwater management strategies to service the needs of existing residents and future population growth. The preferred servicing solution is to expand and enhance the existing stormwater management systems. The Study Report identifies a number of stormwater system improvement projects that should be implemented to accommodate the planned growth through 2031.

Subject to comments received as a result of this notice, the City of Vaughan intends to proceed with implementation of the recommended projects included in the Master Plan Study Report. Additional investigations will be carried out for any Schedule B projects at a later date.

**PUBLIC COMMENTS INVITED**

A Stormwater Management Master Plan document has been prepared. The report details the problem/opportunity statement, the evaluation of alternative solutions and the preferred solutions, as well as public and agency consultation conducted during the Study. The Study Report is available for public review and comment at the following locations during regular business hours from July 24, 2014 to August 24, 2014:

**VAUGHAN CITY HALL**
2141 Major Mackenzie Drive, Level 2
Vaughan, ON L6A 1T1

**PIERRE BERTON LIBRARY**
4921 Rutherford Road
Vaughan, ON L4L 1A6

**BATHURST CLARK RESOURCE LIBRARY**
900 Clark Avenue West
Vaughan, ON L4J 8C1

The Master Plan Report and previously presented study information are also available at Vaughan's website at www.vaughan.ca or www.vaughaninfrastructure.ca. For further information or to provide comments, please contact:

**Saad Yousaf, P. Eng. PMP**
City of Vaughan – Storm Drainage Engineer
Development/Transportation Engineering Department
2141 Major Mackenzie Drive
Vaughan, ON L6A 1T1
905-832-8585 Ext. 8433
saad.yousaf@vaughan.ca

**Please note that information related to these studies will be collected in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments received will become part of the public record and may be included in study documentation prepared for public review. Thank you for your interest in this Study.**

**ANDREW PEARCE, Director of Development/Transportation Engineering**
*This Notice issued July 24, 2014*

# APPENDIX D
# Technical Advisory Committee And Management

Please also invite Jonathan Ping of our Planning Dept from York Planning : Paul Bottonley

# SIGN IN SHEET

**Technical Advisory Committee (TAC) Meeting #1**
**City of Vaughan**
**City-Wide Urban Water Infrastructure Master Plan Studies**

**September 27, 2011 2:30 pm to 4:30 pm - City of Vaughan Committee Room No. 244**

| Name (Please Print) | Title | E-Mail |
|---|---|---|
| Stephen Fung | Manager, Capital Planning + Engineering York Region | stephen.fung@york.ca |
| Jeff Sikex-Childs | Manager Parks Services | jeffery.childs@vaughan.ca |
| ROB MEEK | MANAGER OF ENVIRONMENTAL AND TECHNICAL SERVICES | ROB.MEEK@VAUGHAN.CA |
| Vince Musacchio | Manager – Capital Planning and Infrastructure City of Vaughan | Vince.Musacchio@Vaughan.ca |
| SAMEER DHALLA | TRCA, SENIOR MANAGER, WATER RESOURCES | SDHALLA@TRCA.ON.CA |
| CARLOS COTO | SEA - DEV/TRANS ENG CITY OF VAUGHAN | CARLOS.COTO@VAUGHAN.CA |
| ROBERT MAYER | EA - DEV/TRANSP. ENG DEPTMT. CITY OF VAUGHAN. | robert.mayer@vaughan.ca |
| TONY ARTUSO | SEA – DEV/TRANS ENG. – CITY OF VAUGHAN | TONY.ARTUSO@VAUGHAN.CA |
| EDWARD GRAHAM | PROJECT MANAGER COLE ENGINEERING | egraham@coleengineering.ca |
| GEOFF MASOTTI | COLE ENGINEERING | gmasotti@coleengineering.ca |

# SIGN IN SHEET

**Technical Advisory Committee (TAC) Meeting #1**
**City of Vaughan**
**City-Wide Urban Water Infrastructure Master Plan Studies**
**September 27, 2011 2:30 pm to 4:30 pm - City of Vaughan Committee Room No. 244**

| Name (Please Print) | Title | E-Mail |
|---|---|---|
| Arun Hindupur | Water Resources Engineer<br>Cole Engineering | ahindupur@coleengineering.ca |
| SAAD YOUSAF | STORM DRAINAGE ENGINEER<br>COV. | Saad.yousaf@vaughan.ca |
| MELANIE MORRIS attending for Paul Gardner | CONSTRUCTION COORDINATOR - PARKS DEVELOPMENT - COV | melanie.morris@vaughan.ca |
| June Little | Manager P, D & R<br>TRCA<br>York West | jlittle@TRCA.ON.CA |
| C. Woodland | Director, Planning and Development<br>TRCA | cwoodland@TRCA.ON.ca |
| Michael Frieri | Manager of Engineering Planning & Studies | michael.frieri@vaughan.ca |
| Fabian Papa | FP&P | |
| Kevin. Brown | TMIG. | |
| Marjie Fraser | Dir. of Parks & Forestry Ops. | marjie.fraser@vaughan.ca |
| | | |

# Presentation Overview

**Technical Advisory Committee (TAC) Meeting #1**
**City-Wide Urban Water Infrastructure Master Plan Studies**

**September 27, 2011 2:30 pm to 4:30 pm - City of Vaughan Committee Room No. 244**

1. Introduce the two Projects, and the Project Teams
   a. Map of Planned Growth Areas (Intensification, Urban Boundary Expansion, Secondary Plans)

2. Project Objectives

3. Schedule for the Concurrent Master Plans

4. Communications Protocol / Mechanism for Involvement

5. Water/Wastewater Specifics:
   a. Extents of Existing Water Servicing
   b. Extents of Existing Sanitary Servicing
   c. Problem Statement

6. Storm Water/Storm Drainage Specifics:
   a. Existing Watershed Boundaries and Natural Hazard Areas
   b. Extents of the Storm Sewer Servicing and SWM Infrastructure/Facilities
   c. Rainbow Creek Watershed
   d. Problem Statement

7. Discussion of Specific Concerns/Considerations Raised by the TAC

# SIGN IN SHEET

**Technical Advisory Committee Meeting #2**
City of Vaughan
City-Wide Urban Water Infrastructure Master Plan Studies

| Organization | First Name | Last Name | Position | Email | Signature |
|---|---|---|---|---|---|
| City of Vaughan | Michael | Frieri | Manager, Engineering Planning & Studies | michael.frieri@vaughan.ca | |
| | Saad | Yousaf | Storm Drainage Engineer | saad.yousaf@vaughan.ca | |
| | Robert | Mayer | Engineering Assistant | robert.mayer@vaughan.ca | |
| | Tony | Artuso | Senior Engineering Assistant | tony.artuso@vaughan.ca | |
| | Carlos | Couto | Senior Engineering Assistant | carlos.couto@vaughan.ca | |
| | Jeff | Silcox-Childs | Manager, Parks Services | jeffery.childs@vaughan.ca | |
| | Rob | Meek | Manager, Environmental and Technical Services | rob.meek@vaughan.ca | |
| | Vince | Musacchio | Manager, Capital Planning and Infrastructure | vince.musacchio@vaughan.ca | |
| | Melanie | Morris | Construction Coordinator, Parks Development | melanie.morris@vaughan.ca | |
| | Paul | Jankowski | Commissioner of Engineering & Public Works | paul.jankowski@vaughan.ca | |
| | Andrew | Pearce | Director, Development/Transportation Engineering | andrew.pearce@vaughan.ca | |
| | Paolo | Masaro | | Paolo.Masaro@vaughan.ca | |
| | Grant | Uyeyama | | grant.uyeyama@vaughan.ca | |
| York Region | ~~Stephen~~ LINA | ~~Fung~~ ARIZA | Manager, Capital Planning and Engineering | stephen.fung@york.ca | |
| | ~~Tesseme~~ | ~~Mulugeta~~ | | ~~tesseme.mulugeta@york.ca~~ | |
| | ~~Jonathan~~ | ~~P'ng~~ | Manager, Water & Wastewater Planning | ~~jonathan.p'ng@york.ca~~ | |
| Toronto and Region Conservation Authority | Dan | Hipple | Water Resources Engineer | DHipple@trca.on.ca | |
| | Shahzad | Khan | Water Resources Analyst | skhan@trca.on.ca | |
| | ~~Alison~~ | ~~MacLennan~~ | Water Resources Analyst | amaclennan@trca.on.ca | |
| | June | Little | Manager, P, D & R | jlittle@trca.on.ca | |
| | ~~Carolyn~~ | ~~Woodland~~ | Director, Parks and Development | ~~cwoodland@trca.on.ca~~ | |
| M.O.E. | Dorothy | Moszynski | Environmental Resource Planner & EA Coordinator | dorothy.moszynski@ontario.ca | |
| Cole Engineering Group | Geoff | Masotti | Assistant Project Manager | gmasotti@coleengineering.ca | |
| | Arun | Hindupur | Water Resources Engineer | ahindupur@coleengineering.ca | |
| The Municipal Infrastructure Group (TMIG) | ~~Eric~~ | ~~Tuson~~ | Project Manager | etuson@tmig.ca | |
| | Kevin | Brown | Senior Municipal Project Engineer | kbrown@tmig.ca | |
| Fabain Papa & Partners | Fabian | Papa | Project Manager | fpapa@fabianpapa.com | |

TECHNICAL ADVISORY COMMITTEE
MEETING #2

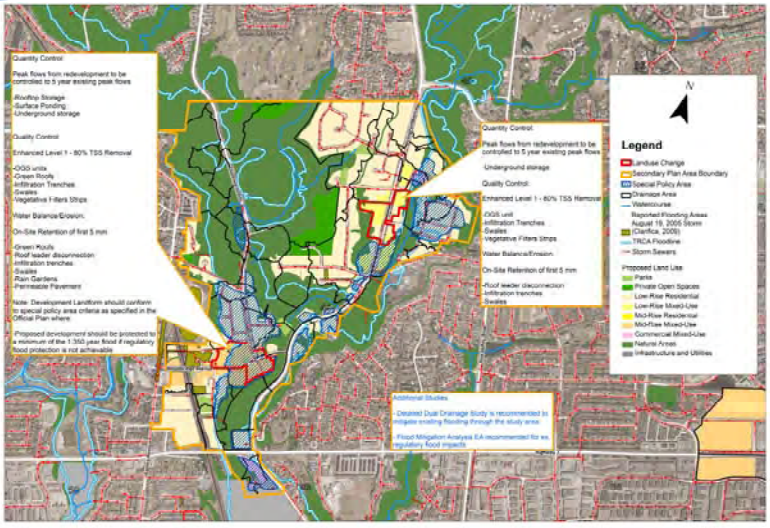
CITY OF VAUGHAN CITY-WIDE STORM DRAINGE / STORM WATER MANAGEMENT MASTER PLAN

PRELIMINARY SWM SERVICING PLANS

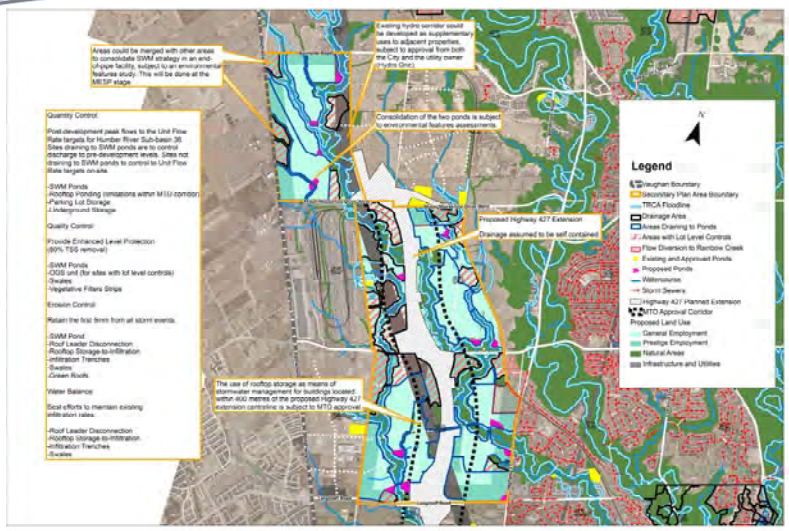




## Woodbridge Core Secondary Plan Area



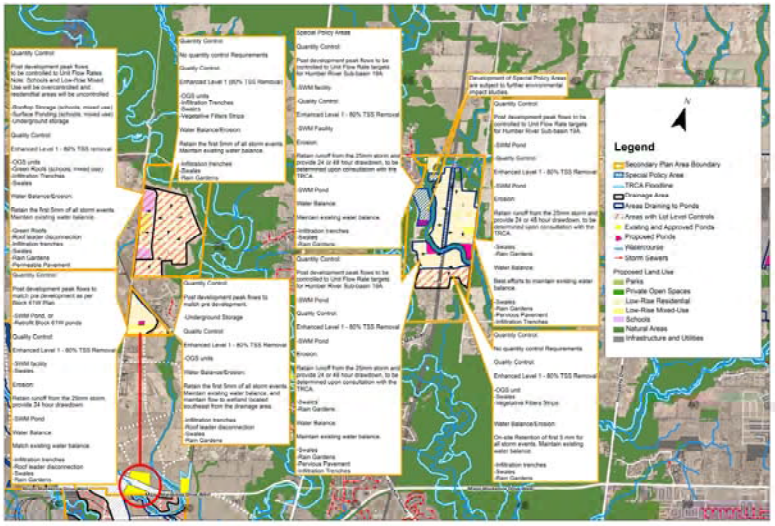
## West Vaughan Employment Area



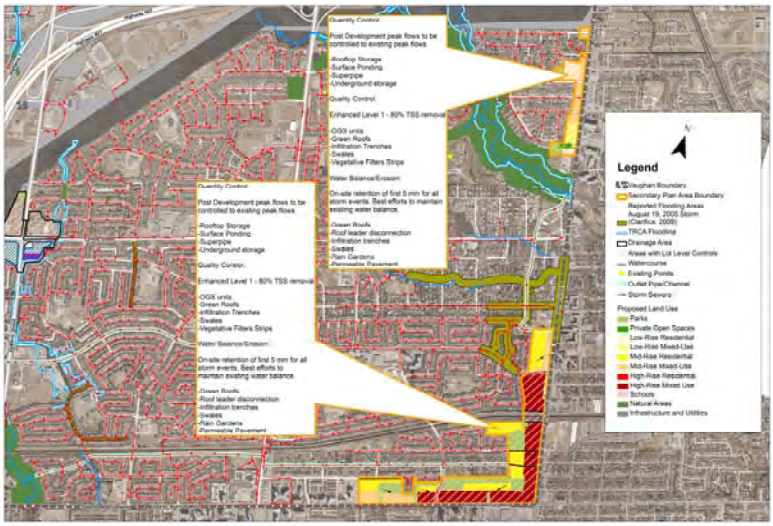





## Kleinburg-Nashville Secondary Plan Area



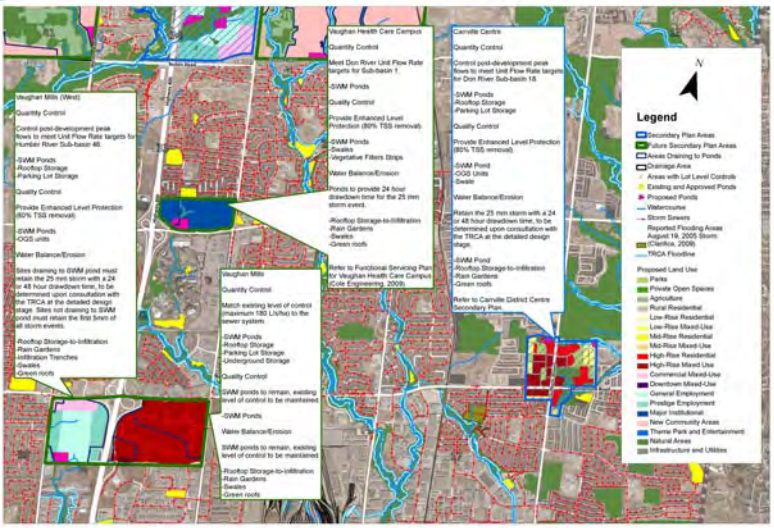
## Yonge-Steeles Secondary Plan Area



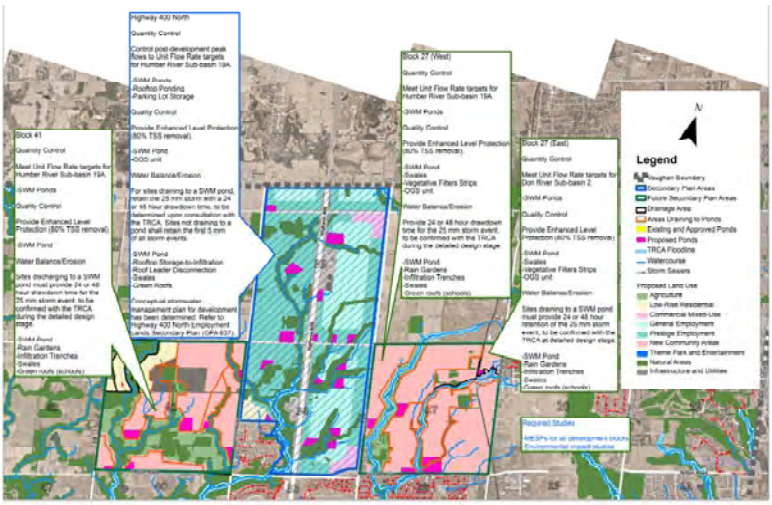





## Vaughan Mills, Vaughan Health Campus of Care, Carrville Centre



## Block 41, Highway 400 North, Block 27

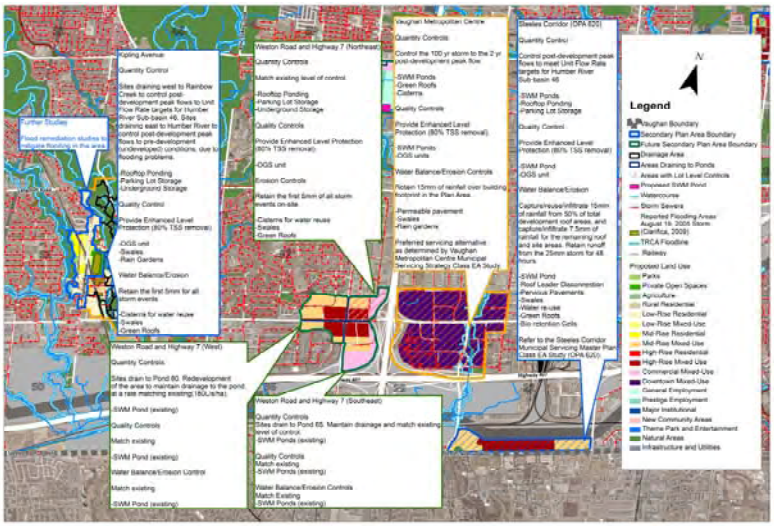







## Concord Centre, Dufferin Centre, Promenade Mall

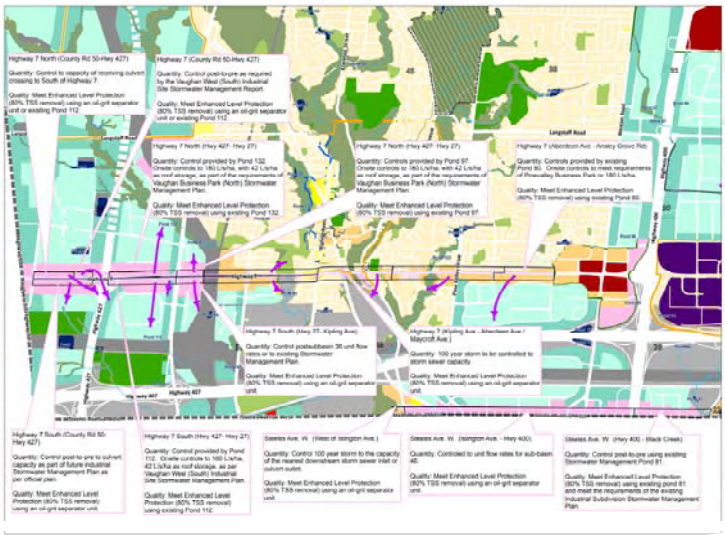
## Kipling Avenue, Weston Rd & Hwy 7, VMC, Steeles Corridor



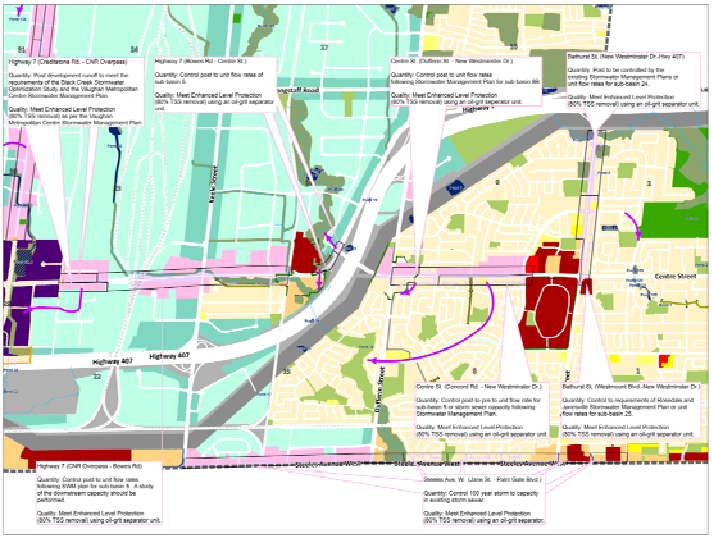





## Intensification Corridor (Highway 7)



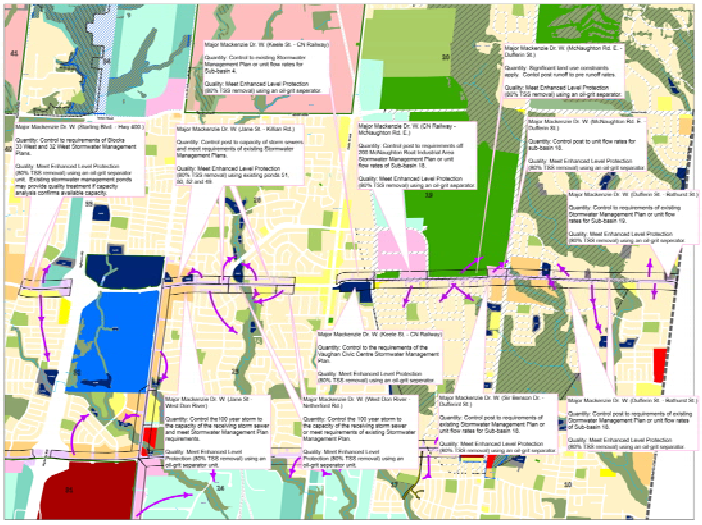
## Intensification Corridor (Highway 7)



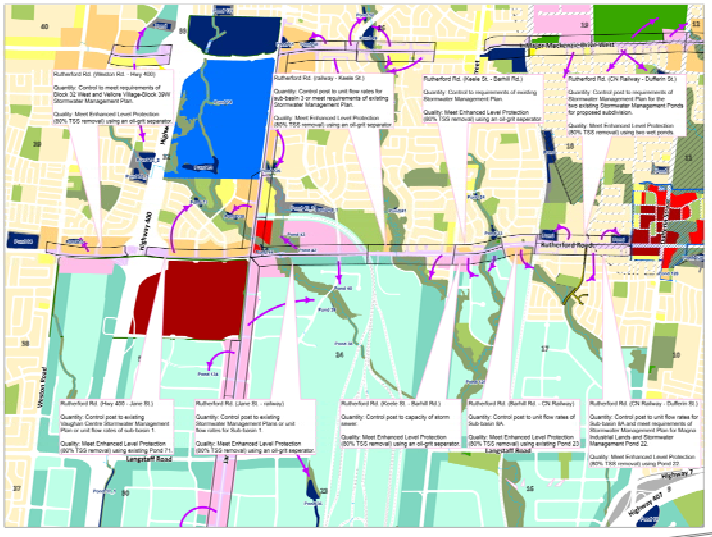




## Intensification Corridor (Major Mackenzie Drive)



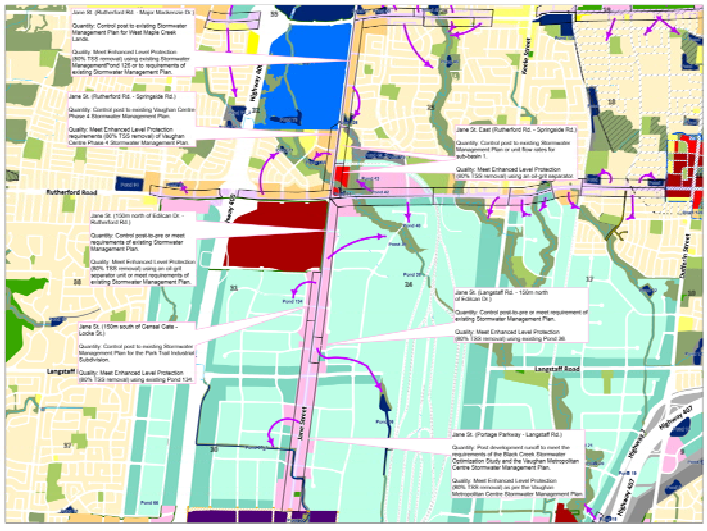
## Intensification Corridor (Rutherford Road)



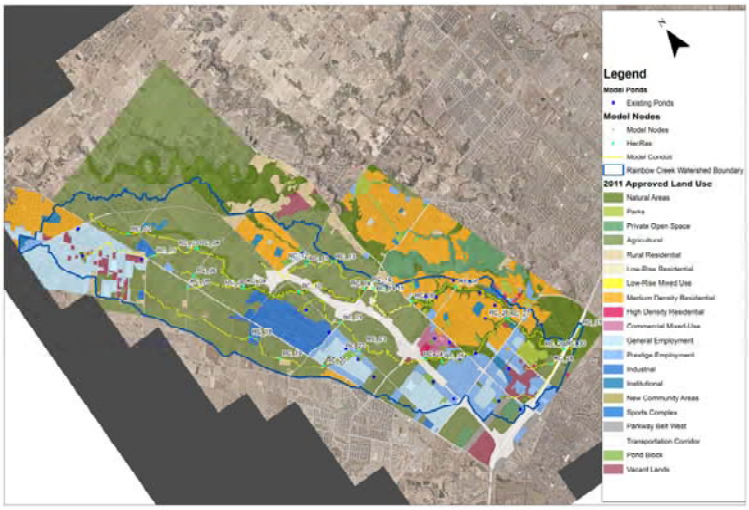





## Intensification Corridor (Major Mackenzie Drive)



## Rainbow Creek - Approved Land Use (Previous Official Plan)

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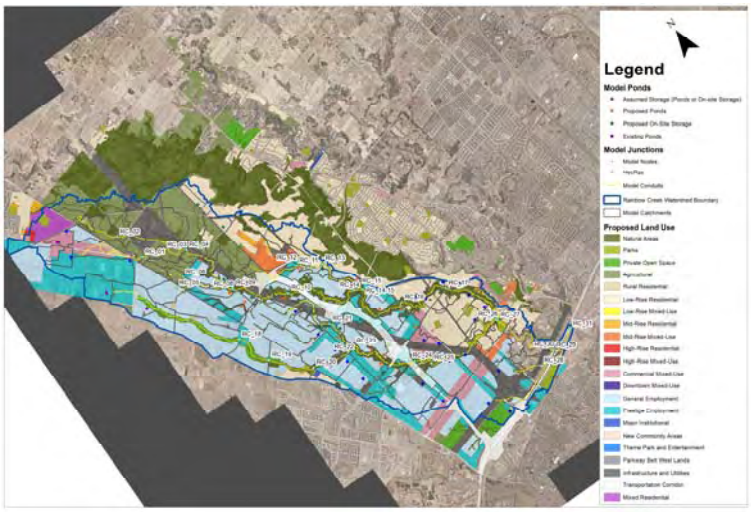
## Rainbow Creek – 2031 Land Use

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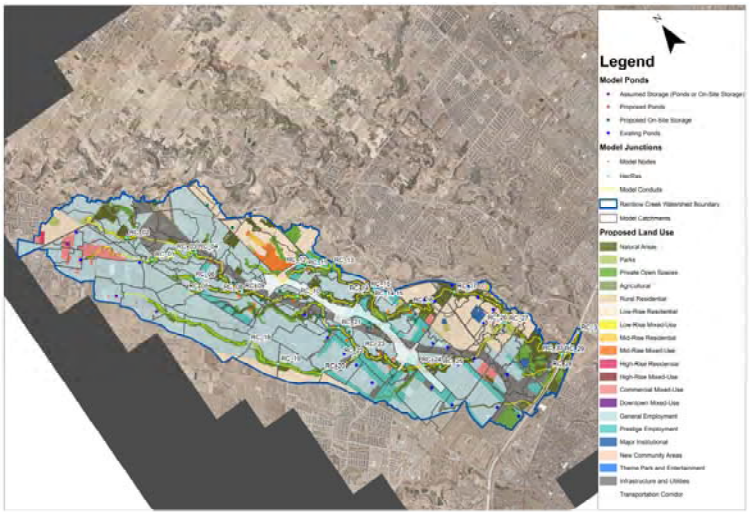
# Rainbow Creek – 2051 Land Use

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