FEBRUARY 3, 2022

PROJECT NO: 1060-4513/5590/ 6220

Eco Park Expansion One Inc.
3621 Highway 7, East, Suite 503
Markham, ON, L3R 0G6

Attention: Shakir Rehmatullah
President

RE: DUNDALK MINISTERIAL ZONING ORDER
TOWNSHIP OF SOUTHGATE
FUNCTIONAL SERVICING, TRAFFIC & STORMWATER MANAGEMENT BRIEF

Dear Shakir,

The following Brief has been prepared by C.F. Crozier & Associates Inc. (Crozier) to support the proposed residential developments located at the following addresses in the Village of Dundalk, Township of Southgate (Township), County of Grey (County). This letter is in support of a Ministerial Zoning Order (MZO). The proposed developments will herein be referred to as the Subject Development.

- Dundalk Northwest Development
  - 752212 Ida Street
- Dundalk Northeast Development
  - Concession 1 SWTSR Lot 225, Concession 2; SWTSR Part Lots 225 and 226 RP 16R7565 Part 1
- Dundalk Southeast Development
  - 772060 Highway 10

Dundalk Northwest Development

The Subject Development is approximately 24.8 ha and is bounded by agricultural lands to north, existing residential properties and Ida Street to the east, an existing cemetery and Grey Road 9 to the south and forested area to the west. Refer to **Figure 1** for the Site Location Plan.

The proposed Concept Plan (MHBC, January 31, 2022) for the development has been presented in **Figure 2A**. The elements of the Concept Plan include approximately 450 residential units, parks, a School Block open space and two stormwater management facilities.

Dundalk Northeast Development

The Subject Development is approximately 132.3 ha and is bounded by agricultural lands to the north, Highway 10 to the east, a mixture of agricultural and residential properties to the south and the Grey County CP Rail Trail to the west. Refer to **Figure 1** for the Site Location Plan.

The proposed Concept Plan (MHBC, February 1, 2022) for the development has been presented in **Figure 2B**. The elements of the Concept Plan include approximately 1650 residential units, parks, open space, school block and a stormwater management facility.

Dundalk Southeast Development

The Subject Development is approximately **60** ha and is bounded by agricultural lands to the north and South, Highway 10 and existing residence to the east and the Grey County CP Rail Trail to the west. Refer to Figure 1 for the Site Location Plan.

The proposed Concept Plan (MHBC, January 31, 2022) for the development has been presented in **Figure 2C**.

Our office has analyzed the impact of the proposed developments on their respective boundary road networks (Section 3). A preliminary analysis of the site grading (Section 4) servicing (Section 5) stormwater management (Section 6) and utility servicing (Section 7) strategies for the aforementioned developments have also been undertaken by Crozier.

The proposed servicing strategy outlined herein is predicated on the Concept Plans referenced above. It should be noted that the concept plans are subject to minor changes, however, this should not substantially impact the conclusions drawn in this letter.

The Developer has assembled a multi-disciplinary team which includes MHBC (Planner), SLR Consulting (SLR) (Natural Heritage, Hydrogeological), and Crozier (Engineering). These consultants have prepared studies/plans to support the planning application. This report prepared by Crozier should be read in conjunction with the work of the other team members.

1.0 SITE DESCRIPTION

1.1 Dundalk Northwest Development

The lands proposed for development are located adjacent to the northwest quadrant of Dundalk. The Subject Development is part of an overall 24.8 ha property owned by the Developer, approximately 7.3 ha of which are located within the current Dundalk Settlement Boundary. The entire 24.8 ha property is herein referred to as Dundalk Northwest.

The Subject Development is currently characterized by active agricultural fields, 4 single existing detached dwellings and forested area. Based on existing contours, the Subject Development currently exabits a split drainage runoff pattern with approximately 11.5 ha draining to the southeast quadrant of the site and the remaining 13.3 ha draining to the southwest quadrant. There is an approximate elevation difference of 7 m across the site.

1.2 Dundalk Northeast Development

The Proposed Dundalk Northeast development lands are located northeast of the existing Dundalk Settlement Boundary and is comprised of 3 separate existing parcels owned by the Developer. The Dundalk Northeast Development combines to a total 132.3 ha in size and is herein referred to as Dundalk Northeast.

The Subject Lands consist primarily of active agricultural fields as well forested environmental protection areas in the central and northeast portions of the site. The limits of the EP lands have been reviewed and appropriate development setbacks have been applied to the proposed development Concept Plan (**Figure 2B**). The property displays a split drainage pattern comprised of rolling hills with approximately two thirds of the site draining towards and under the jurisdiction

of the Saugeen Valley Conservation Authority and the remaining third draining towards and under the jurisdiction of Grand River Conservation Authority.

1.3 Dundalk Southeast Development

The Proposed Dundalk Southeast Development lands are located Southeast of the existing Dundalk Settlement Boundary and is a combination of properties totaling 60.4 ha owned by the Township and the Developer.

The Subject Lands consist primarily of active agricultural fields, a small forest stand located in the middle of the site as well as an environmental protection area along the southern border. The limits of the EP lands have been reviewed and appropriate development setbacks have been applied to the proposed development Concept Plan (**Figure 2C**). The property displays a drainage pattern comprised of rolling hills draining towards the central southern region of the site which has been identified as EP Lands.

2.0 BACKGROUND

2.1 Dundalk Northwest Development

Dundalk Northwest is currently designated Rural and Hazard Lands in the Township of Southgate Official Plan – Schedule A1(February 2006). Per the Township's Zoning By-Law 19-2002 (June 2020), the Subject Development is zoned as Restricted Agricultural. The purpose of the MZO Application is to rezone theDundalk Northwest development and bring it into the Township's Settlement boundary.

Per review of Conservation Authority mapping, it appears that a portion of the development is located in the Grand River Conservation Authority (GRCA) regulation area and a portion in the Saugeen Valley Conservation Authority (SVCA) regulation area. As such, the appropriate permits and approvals will need to be obtained from both the GRCA and the SVCA.

2.2 Dundalk Northeast Development

As per the Township of Southgate Zoning By-Law – Schedule 17 (2009), Dundalk Northeast is currently zoned as Agricultural (A1), Restricted Agricultural (A2) as well as Environmental Protection (EP). As per the Township of Southgate Official Plan – Schedule A Map 1 (2021), the current designated land uses are rural and hazard lands. The purpose of the MZO Application is to rezone the Dundalk Northeast development and bring it into the Township'sSettlement Boundary..

The site lies within the regulatory boundary of the Saugeen Valley Conservation Authority (SVCA) and the Grand River Conservation Authority (GRCA), as such the appropriate approvals and permits will need to be obtained from both authorities.

2.3 Dundalk Southeast Development

As per the Township of Southgate Zoning ByLaw – Schedule 17 (2009), the Dundalk Southeast currently zoned as Agricultural (A1). As per the Township of Southgate Official Plan – Schedule A Map 1 (2021), the current designated land uses Rural and hazard lands. The purpose of the MZO Application is to rezone theDundalk Southeast development and bring it into the Township's Settlement Boundary.

The site lies within the regulatory boundary of the Grand River Conservation Authority (GRCA) and they will be required to provide appropriate approvals and permits necessary for the development.

3.0 BOUNDARY ROAD NETWORK

The boundary road network is summarized in **Table 1** below. With skewed directions, the directional orientation of the road network is ambiguous. To provide clarity throughout this report, Highway 10 has been given a north-south orientation while County Road 9/Main Street West has been given an east-west orientation, and all other orientations were assigned in relation.

Table 1: Boundary Road Network Summary

Road	Direction	Lanes	Posted Speed (km/h)	Classification	Jurisdiction
Highway 10	North/South	2	80 km/h	Provincial Highway	MTO
County Road 9/ Main Street West	East/West	2	50 km/h	County Highway	Grey County
Ida Street	North/South	2	50 km/h	Local Road	Township of Southgate
Glenelg Street	East/West	2	50 km/h	Local Road	Township of Southgate
Dundalk Street	North/South	2	Assumed 50 km/h	Local Road	Township of Southgate
Bradley Street	North/South	2	Assumed 50 km/h	Local Road	Township of Southgate
Grey Street North/South	East/West	2	Assumed 50 km/h	Local Road	Township of Southgate
Eco Park Way	East/West	2	Assumed 50 km/h	Local Road	Township of Southgate

Highway 10 is a north-south two-way highway under the jurisdiction of Ontario Ministry of Transportation (MTO). The roadway consists of two travel lanes with granular shoulders. No pedestrian facilities exist on either side of this highway.

Main Street (Grey County Road 9) is an east-west two-lane two-way roadway under the jurisdiction of the County of Grey. The roadway consists of two travel lanes with curb and gutter and approximate 1.5 metre concrete pedestrian sidewalks exist along the north and south sides of the roadway from Highway 10 to Highpoint Community School. West of the school sidewalks do not continue of the south side of the roadway. West of Ida Street the roadway has paved shoulders and no pedestrian facilities on either side of the roadway

Ida Street and Bradley Street are north-south local roads under the jurisdiction of the Township of Southgate. Both roadways consist of two travel lanes with granular shoulders. No pedestrian facilities exist on either side of the roadway.

Glenelg Street, Grey Street North and Grey Street South are east-west local roads under the jurisdiction of the Township of Southgate. Each roadway consists of two travel lanes with granular shoulders. No pedestrian facilities exist on either side of the roadways.

Dundalk Street is a north-south local road under the jurisdiction of the Township of Southgate. The roadway consists of two travel lanes with curb and gutter. No pedestrian facilities exist on either side of the roadway.

Eco Park Way is an east-west unpaved local road with no pedestrian facilities under the jurisdiction of the Township of Southgate.

The signalized intersection of Highway 10 and Main Street is semi-actuated with left turn lanes in all approaches and crosswalks approximately two metres in width. All other intersection on the boundary road network are stop-controlled intersections with the stop for the minor approach.

4.0 Trip Generation

A trip generation forecast was completed for the three sites based on the proposed preliminary site statistics. The trip generation of the sites were forecasted using the rates provided in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. Relevant excerpts from the ITE Trip Generation Manual, 11th Edition have been included within **Appendix A.**

To determine the forecasted student population for the school blocks, the lot coverage of existing schools within Dundalk was reviewed. It was found that Highpoint Community School and Dundalk & Proton Community School have an average lot coverage of 10 percent.

The Ministry of Education "Building Our Schools, Building our Future" Report (June 2010) provides details relating to Elementary School gross floor areas (GFA) and student populations for schools constructed between 2004 and 2008. Table 5: "Elementary Gross Floor Area and Area per Pupil" was used to estimate the number of students, which was then used to forecast the trip generation of the school block. The trip generation forecasts will be updated as the site plans are refined through future applications.

4.1 Dundalk Northwest Development

The residential neighbourhood units were assessed using LUC 210 "Single Family Detached Housing". The rental apartments were assessed using LUC 220 "Multifamily Housing (Low-Rise)", and the school block was assessed using LUC 520 "Elementary School" based on the approximated student population. The preliminary trip generation forecast is summarized in **Table 2** and is based on the estimated site statistics.

Table 2: Dundalk Northwest Development

Land Use	Units	Peak Hour	Trip Generation		
			In	Out	Total
LUC 210: Single Family Detached	390	a.m.	67	190	257
		p.m.	225	132	357
LUC 220: Multifamily Housing (Low-Rise)	40	a.m.	8	27	35
		p.m.	24	14	38
LUC 520: Elementary School	2,000 m² (200 students)	a.m.	80	68	148
		p.m.	15	17	32
Total		**a.m.**	**155**	**285**	**440**
		p.m.	**264**	**163**	**427**

Based on the data provided in the ITE Trip Generation Manual, 11th Edition, the Dundalk Northwest Development is forecasted to generate 440 and 427 two-way trips in the weekday a.m. and p.m. peak hours, respectively. It is noted that the school block was estimated based on the approximated student population. The trip generation should be further refined once detailed plans are prepared and specific size and uses are known.

4.2 Dundalk Northeast Development

The residential neighbourhood units were assessed using LUC 210 "Single-Family Detached Housing". The rental apartments units were assessed using LUC 220 "Multifamily Housing (Low-Rise)", and the school block was assessed using LUC 520 "Elementary School" based on the approximated student population. The preliminary trip generation forecast is summarized in **Table 3**, and is based on the estimated site statistics.

Table 3: Dundalk Northeast Development

Land Use	Units	Peak Hour	Trip Generation		
			In	Out	Total
LUC 210: Single Family Detached	1,250	a.m.	193	549	742
		p.m.	672	395	1067
LUC 220: Multifamily Housing (Low-Rise)	400	a.m.	35	112	147
		p.m.	121	72	193
LUC 520: Elementary School	4,800 m² (450 students)	a.m.	180	153	333
		p.m.	33	39	72
Total		**a.m.**	**408**	**814**	**1,222**
		p.m.	**826**	**506**	**1,332**

Based on the data provided in the ITE Trip Generation Manual, 11th Edition, the Dundalk Northeast Development is forecasted to generate 1,222 and 1,332 two-way trips in the weekday a.m. and p.m. peak hours, respectively. It is noted that the school block was estimated based on an assumed lot coverage. The trip generation should be further refined once detailed plans are prepared and specific size and use are known.

4.3 Dundalk Southeast Development

The residential neighbourhood units were assessed using LUC 210 "Single-Family Detached Housing". The affordable housing and walkup apartment dwelling units were assessed using LUC 220 "Multifamily Housing (Low-Rise)". The school block was assessed using LUC 520 "Elementary School"

based the approximated student population. The commercial area was assessed using LUC 820 "Shopping Centre (>150k)" based on a 40% lot coverage. As the future use of the industrial lands is unknown at this time the area was assessed generally with LUC 130 "Industrial Park" based on a 50% lot coverage.

The preliminary trip generation forecast is summarized in **Table 4** and is based on the estimated site statistics.

Table 4: Dundalk Southeast Development

Land Use	Units	Peak Hour	Trip Generation		
			In	Out	Total
LUC 210: Single Family Detached	220	a.m.	40	113	153
		p.m.	131	78	209
LUC 220: Multifamily Housing (Low-Rise)	180	a.m.	19	60	79
		p.m.	62	36	98
LUC 520: Elementary School	2,600 m² (200 students)	a.m.	80	68	148
		p.m.	15	17	32
LUC 130: Industrial Park	1,000,000 ft² 93,000 m²	a.m.	275	65	340
		p.m.	75	265	340
LUC 820: Shopping Centre (>150k)	392,000 ft² 36,400 m²	a.m.	226	139	365
		p.m.	724	785	1,509
Total		**a.m.**	**640**	**445**	**1,085**
		p.m.	**1,007**	**1,181**	**2,188**

Based on the data provided in the ITE Trip Generation Manual, 11th Edition, the Dundalk Southeast Development is forecasted to generate 1,085 and 2,188 two-way trips in the weekday a.m. and p.m. peak hours, respectively. It is noted that the school block, industrial and commercial statistics were estimated based on an assumed lot coverage. The trip generation should be further refined once detailed plans are presented and specific size and uses are known.

5.0 Internal Road Geometry

5.1 Dundalk Northwest Development

The concept plan for the Dundalk Northwest Development proposes three connections to County Road 9, and two connections to Ida Street. It is expected that several units will have direct driveway access to Ida Steet along the western development boundary.

While detailed design has not yet been completed for the internal roadways, they will adhere to the standard urban cross section (Township of Southgate Std. R1). Internal intersections should be configured within the acceptable range of 70 degrees to 110 degrees, preferably at 90 degrees. As the site is further refined, it will be important to clarify the primary through roadways and the minor intersecting approaches, so drivers have clarity on rights-of-way.

5.2 Dundalk Northeast Development

The concept plan for the Dundalk Northeast Development proposes a through connection from the future Glenelg Phase 2 Subdivision to Highway 10. A second connection to the Glenelg Phase 2 Subdivision is proposed along the western boundary of the site. Additionally, roadway connections are proposed to the south, including a connection to Bradley Street.

While detailed design has not yet been established for the internal roadways, they will adhere to the standard urban cross section (Township of Southgate Std. R1). Internal intersections should be configured within the acceptable range of 70 degrees to 110 degrees, preferably at 90 degrees. As the site is further refined, it will be important to clarify the primary through roadways and the minor intersecting approaches, so drivers have clarity on rights-of-way.

5.3 Dundalk Southeast Development

The concept plan for the Dundalk Southeast Development proposes to extend the existing Eco Parkway at the west end of the property through to Highway 10 opposite Sideroad 240 at the east end of the property.

While detailed design has not yet been established for the internal roadways, the local roads will adhere to the standard urban cross section (Township of Southgate Std. R1. Internal intersections should be configured within the acceptable range of 70 degrees to 110 degrees, preferably at 90 degrees. The vertical and horizontal alignment of the proposed roadways will be confirmed through detailed design.

6.0 Access Locations & Spacing

6.1 Dundalk Northwest Development

The eastern County Road 9 entrance is approximately 160 m west of Ida Street. The central County Road 9 entrance is approximately 600 m west of the eastern access. The western and central entrances are approximately 160 metres apart. The Grey County Entrance Permit indicates that the distance between municipal intersecting roads shall be at least 400 m. While the proposed entrance spacing is less than 400 m, the document also indicates that the Director of Transportation Services may approve a variance to this if there are no safety or operational concerns.

The Transportation Association of Canada Geometric Design Guidelines for Canadian Roads identifies typical spacing of 60 m on collector roadways and 200 m on arterial roadways. As the proposed development would expand the urban core of Dundalk, the proposed entrance spacing is considered appropriate, and is greater than the typical intersection spacing provided on Main Street, east of Ida Street. The proposed entrance location and geometry will continue to be refined through future design efforts and development applications.

While detailed analysis will be completed as part of future applications, sight distance issues are not expected given the relatively straight and flat profile of County Road 9 and Ida Street.

6.2 Dundalk Northeast Development

Consideration for pedestrian safety will need to be undertaken at the western site accesses as they will cross the Grey County CR Rail Trail.

Future analysis based on a detailed plan will review intersection spacing and sight distance requirements based on the MTO's Highway Corridor Management Manual and the Transportation Association of Canada's Geometric Design Guidelines for Canadian Roads. Per the MTO Highway Corridor Management Manual, for a 2B Arterial Highway, new public roads should be at least 800 m from existing signalized or unsignalized intersections. The preliminary concept provides more

than 800 m of spacing between the Highway 10 entrance and Main Street to the south and Sideroad 22/220 to the north.

Future analysis based on a detailed plan should include a review of auxiliary left and right-turn lane requirements at the proposed Highway 10 entrance. Furthermore, sight distances at the intersection should be reviewed once the ultimate location is established. Based on a preliminary review, sight distance restrictions are not expected.

Additionally, intersection spacing within the existing and proposed urban areas will be reviewed based on the Township's Standards and the Transportation Association of Canada's Geometric Design Guidelines for Canadian Roads. For local roads the typical spacing is 60 m for a 4-legged intersection and 40 m for a 3-legged intersection.

6.3 Dundalk Southeast Development

Consideration for pedestrian safety will need to be undertaken for the Eco Parkway connection as it will cross the Grey County CR Rail Trail.

Future analysis based on a detailed plan will review intersection spacing and sight distance requirements based on the MTO's Highway Corridor Management Manual and the Transportation Association of Canada's Geometric Design Guidelines for Canadian Roads. Per the MTO Highway Corridor Management Manual, for a 2B Arterial highway, new public roads should be at least 800 m from an existing signalized or unsignalized intersection, with 1600 m of spacing considered desirable. No conflicts are expected based on a preliminary review.

7.0 SITE GRADING

The site grading for the developments will be influenced by the sanitary and storm sewer drainage systems and inverts of the ultimate receivers to provide sufficient cover.

The road network will have slopes at or greater than 0.5% and less than 5%. Grading of roadways will be completed to ensure no flooding of private property, nor will flow depths greater than 0.30 m occur during the 100-year storm event.

As we progress through the planning applications, a groundwater monitoring program will be initiated to determine the seasonally high groundwater level across the three sites. Once the seasonally high groundwater level has been established, the basement floor elevations will be set to ensure sufficient clearance.

8.0 CIVIL SERVICING

8.1 Sanitary Servicing

8.1.1 Existing Sanitary Servicing

The existing wastewater treatment plant (WWTP) is located on Eco Parkway at the south end of Dundalk. The plant treats sewage and discharges the treated effluent to the Foley Drain which is a tributary of the Grand River. Per the Township of Southgate 2021 Reserve Capacity Study, the existing WWTP has an uncommitted reserve capacity of 127 new development equivalent residential units (ERU's). It should be noted that the municipality is currently in the process of upgrading the WWTP to increase capacity in Dundalk from 1,832 m^3/day to 3,025 m^3/day to

support future growth. The estimated completion dates of the WWTP upgrades are early 2023 and will increase the number of available uncommitted ERU's to 1408. Please refer to **Appendix B** for the 2021 Reserve Capacity Study.

Dundalk Northwest Development

There is currently no existing sanitary infrastructure along the portion of Grey Road 9 and Ida Street which bounds Dundalk Northwest. The nearest sanitary infrastructure includes:

- 200 mm Gravity sanitary sewer on Grey Road 9 (Main Street) approximately 200 m east of the intersection of Grey Road 9 and Ida Street.
- 200 mm Gravity sanitary sewer on Victoria Street West approximately 350 m east of Ida Street.
- 200 mm diameter gravity sanitary sewer on Hanbury Street approximately 300 m south of the intersection of Grey Road 9 and Ida Street.

Dundalk Northeast Development

There is currently no existing sanitary infrastructure located at the limits of Dundalk Northeast. Two proposed new residential developments abut the proposed development to the west and will provide suitable gravity sanitary outlets for the west third of the development via road connections and servicing stubs. The remaining east two thirds of the Dundalk Northeast Development along Highway 10 will require a sanitary pumping station and force main system to discharge wastewater to the existing Dundalk sanitary network. All internal development roadways will be serviced via gravity sewer connecting to either the proposed sanitary pumping station or gravity service stubs provided by adjacent developments. These developments include:

- White Rose Development Phase 3 connection to the 200mm dia. Bradley Street gravity sanitary sewer extension.
- Glenelg Phase 2 Development connections to the proposed 200mm dia. Street 'C' gravity sanitary sewer (Glenelg Phase 2 Draft Plan, Dec 2021).

Dundalk Southeast Development:

There is currently no existing sanitary infrastructure located at the limits of the Dundalk Southeast lands. Given the proximity to the existing municipal wastewater treatment lagoon system, it is recommended that a new connection point directly to the treatment system be established as part of the extension of Eco Parkway. To connect the proposed development to the Dundalk Wastewater Treatment and Collection System an external sanitary sewer is proposed to be constructed starting at the Treatment Plant along the existing Eco Parkway Right-of-Way continuing along the proposed roadway extension to the Dundalk Southeast development limits.

8.1.2 Internal Sanitary Servicing Strategy

Dundalk Northwest Development:

Internal sanitary servicing for the development will be provided via a network of gravity sewers that follow the alignment of the internal roadways. Sanitary sewers will be designed and constructed in accordance with the Township design standards, at a size and depth sufficient to service each lot via gravity.

Based on review of all possible connection and assessment of capacity and gravity servicing feasibility, it is recommended that the Subject Development be serviced via connection to the gravity sanitary sewer system on Hanbury Street. To facilitate this connection, approximately 500 m of sanitary sewer will be required along Ida Street. Based on a preliminary analysis it was found that connection to the sanitary sewer on Grey Road 9 and Victoria Street South would not be feasible due to cover constraints. It should also be noted that the existing sanitary sewer on Hanbury Street ranges in diameter from 200 mm to 250 mm and thus it is anticipated that the system has sufficient capacity to accept flows from the Subject Development.

The preliminary sanitary sewer layout has been illustrated in **Figure 3A**.

Preliminary sanitary flows for the site were estimated in conjunction with the proposed zoning and estimated unit counts. The following equivalent population counts were considered:

- Residential Units – 450 units x 2.66 Persons/Unit = 1,197 persons
- Commercial/School – (5 L/m2/day x 6,860 m2) / (350 L/Persons/day) = 99 persons

Applicable design criteria have been summarized in **Table 5** below.

Table 5: Sanitary Design Criteria

Criteria	Township of Southgate
Average Flow Rate (L/cap/day)	350
Infiltration (L/s/ha)	0.15
Infiltration/Inflow (L/sec)	3.72
Average Daily Flow (L/sec)	5.25
Peaking Factor (Harmon Formula)	3.7
Single Detached Density (PPU)	2.66

Based on above criteria and the unit totals proposed, it is estimated that peak sanitary flow from the Subject Development per Township Standards is 23.27 L/s. Sanitary flow calculations have been provided in **Appendix C.** Local sanitary sewers required to service Dundalk Northwest will be in the range of 200 mm to 250 mm in diameter. Detailed analysis and profiles are to be provided at the detailed design stage.

Dundalk Northeast Development:

Internal sanitary servicing for the development will be provided via a network of gravity sewers that follow the alignment of the internal roadways. Sanitary sewers will be designed and constructed in accordance with the Township design standards, at a size and depth sufficient to service each lot via gravity.

It is proposed that the Subject Development be serviced via connection to the gravity sanitary system that will be installed as part of development of the Glenelg Phase 2 Lands at the West limits of the site. Based on a preliminary capacity analysis of the sanitary sewers downstream of the Glenelg Subdivision, it was found that the sewer network has capacity to accommodate 200 additional ERUs of flow above the proposed Glenelg Phase 2 demands.

Additional sanitary flows from Dundalk Northeast that can be serviced via gravity connection will connect to the proposed future sewer stub along Bradley Street at the southeast limits of the site.

The remaining lands that cannot connect by gravity to the existing system will be conveyed to a proposed sanitary pumping station which will convey wastewater from the proposed development to a suitable outlet within the existing Dundalk wastewater collection network. Details of the ultimate conveyance capacity of downstream infrastructure is subject to ongoing review with the Township's Engineering Consultant.

The preliminary sanitary sewer layout has been illustrated in **Figure 3B.**

Preliminary sanitary flows for the site were estimated in conjunction with the proposed zoning and estimated unit counts. The following equivalent population counts were considered:

- Residential Units – 1650 units x 2.66 Persons/Unit = 1,064 persons
- Commercial/School – (5 L/m2/day x 19,100 m2) / (350 L/Persons/day) = 273 persons

Applicable design criteria have been summarized in **Table 6A, 6B and 6C** below.

Table 6A: Sanitary Design Criteria (Glenelg Outlet)

Criteria	Township of Southgate
Average Flow Rate (L/cap/day)	350
Infiltration (L/s/ha)	0.15
Infiltration/Inflow (L/sec)	1.42
Average Daily Flow (L/sec)	2.16
Peaking Factor (Harmon Formula)	4.0
Single Detached Density (PPU)	2.66
Townhouse Density (PPU)	2.66

Table 6B: Sanitary Design Criteria (Bradley Street Outlet)

Criteria	Township of Southgate
Average Flow Rate (L/cap/day)	350
Infiltration (L/s/ha)	0.15
Infiltration/Inflow (L/sec)	2.33
Average Daily Flow (L/sec)	2.78
Peaking Factor (Harmon Formula)	3.9
Single Detached Density (PPU)	2.66
Townhouse Density (PPU)	2.66

Table 6C: Sanitary Design Criteria (Sanitary Pumping Station)

Criteria	Township of Southgate
Average Flow Rate (L/cap/day)	350
Infiltration (L/s/ha)	0.15
Infiltration/Inflow (L/sec)	12.75
Average Daily Flow (L/sec)	13.93
Peaking Factor (Harmon Formula)	3.4
Single Detached Density (PPU)	2.66
Townhouse Density (PPU)	2.66

Based on above criteria and the unit totals proposed, it is estimated that peak sanitary flow from the Subject Development to the Glenelg Phase 2, Bradley Street Outlets as well as the proposed sanitary pumping station per Township Standards are 9.96 L/, 13.25L/s and 59.99 L/s respectively. Sanitary flow calculations have been provided in **Appendix C.** Detailed analyses of the sanitary sewer required to serve the development are to be provided at the detailed design stage.

Dundalk Southeast Development:

Internal sanitary servicing for the development will be provided via a network of gravity sewers that follow the alignment of the internal roadways. Sanitary sewers will be designed and constructed in accordance with the Township design standards, at a size and depth sufficient to service each lot via gravity.

It is proposed that the Subject Development be serviced via connection to the proposed external gravity sanitary system that will be installed along Eco Parkway and the Eco Parkway extension terminating at the Wastewater Treatment Plant. The proposed external sanitary sewer will be adequately size to support the development and will be confirmed during detailed design.

The preliminary sanitary sewer layout has been illustrated in **Figure 3C.**

Preliminary sanitary flows for the site were estimated in conjunction with the proposed zoning, equivalent residential population calculations for the industrial, school, commercial, and residential zones for the Subject Development. The following equivalent population counts were considered:

- Residential Units – 400 units x 2.66 Persons/Unit = 1,064 persons
- Commercial/School – (5 L/m^2/day x 45,300 m^2) / (350 L/Persons/day) = 647 persons
- Industrial – (3.5 L/m^2/day x 111,800 m^2) / (350 L/Persons/day) = 1,118 persons

Applicable design criteria have been summarized in **Table 7** below.

Table 7: Sanitary Design Criteria (Glenelg Outlet)

Criteria	Township of Southgate
Average Flow Rate (L/cap/day)	350
Infiltration (L/s/ha)	0.15
Infiltration/Inflow (L/sec)	8.52
Average Daily Flow (L/sec)	11.46
Peaking Factor (Harmon Formula)	3.8
Single Detached Density (PPU)	2.66
Townhouse Density (PPU)	2.66

Based on above criteria and the unit totals proposed, it is estimated that peak sanitary flow from the Subject Development per Township Standards is 51.86 L/s. Sanitary flow calculations have been provided in **Appendix C.** Detailed analyses of the sanitary sewer required to serve the development are to be provided at the detailed design stage.

8.2 Water Servicing

8.2.1 Existing Water Servicing

Potable water for the Subject Development will be supplied by the Township's municipal water distribution system. The existing water treatment plant (WTP) system in Dundalk includes three existing production wells. Per the Township of Southgate 2021 Reserve Capacity Study, the water supply system has an available uncommitted reserve capacity of 1,526 ERU's. The Township's Permit to Take Water indicates an allowable daily water taking of 2,817 m^3/day. It should be noted that the Township has completed an Environmental Assessment to build a Water Tower in Dundalk. Timing of construction is still being finalized, however this will be included in the detailed design and allocation requirements for these developments as deemed necessary. Please refer to **Appendix D** for the 2021 Reserve Capacity Study.

Dundalk Northwest Development

Existing watermain runs along the frontage of the proposed development along Ida Street to the Glenelg Street connection approximately 200m northwest of the site. There is currently no existing watermain along County Road 9. Please See **Figure 4A**.

Dundalk Northeast Development

There are currently no existing water connections available at the limits of Dundalk Northeast. The Glenelg Phase 2 and White Rose Phase 3 Developments that abut Dundalk Northeast have accounted for future servicing connections to these lands and will provide three watermain connection locations for the proposed development on the west side. Proposed watermain connections on the east side will connect to the future municipal systems through the adjacent properties to the south or alternatively along the Highway 10 corridor. Please see **Figure 4B** for more details.

Dundalk Southeast Development

There are currently no existing water connections available at the limits of Dundalk Southeast. The Eco Parkway watermain is proposed to be extended along with the roadway to the proposed development and will provide the primary connection to the development. A secondary connection along Highway 10 or north to the Edgewood Greens Subdivision will also likely be required to meet sufficient flow requirements. Preliminary design for this connection is proposed north of the site along the Highway 10 corridor to the Future Edgewood Greens Phase 11 Municipal Watermain. Please see **Figure 4C** for more details.

8.2.2 Internal Water Servicing Strategy

Dundalk Northwest Development

The proposed servicing solution for Dundalk Northwest will be to connect to the existing watermain on Ida Street, as well as Grey Road 9 to facilitate a looped distribution network per Township and Ministry of Environment, Conservation and Parks (MECP) Standards. Sizing of internal watermain is subject to a distribution analysis, which will be completed as part of detailed design.

Watermain internal to the site will follow the alignment of the road network complete with individual service connections for each lot and building. Fire hydrants will be spaced as required to provide the necessary fire protection and to meet municipal standards.

The preliminary water distribution layout has been presented in **Figure 4A**.

Preliminary water demands for the Subject Development have been estimated in conjunction with Township Standards that concur with Table 3-1 of the MECP Design Guidelines for Drinking Water Systems. Applicable design criteria have been summarized in **Table 8** below.

Table 8: Watermain Design Criteria

Criteria	Township of Southgate
Average Flow Rate (L/cap/day)	331
Max Day/ Peak Hour Factor	2.75/4.13
Single Detached Density (PPU)	2.66
Townhouse Density (PPU)	2.66

The following water demands have been calculated for the Subject Development per Township Standards identified above:

- Average Daily Flow Rate – 4.95L/s
- Max Daily Flow Rate – 13.62 L/s
- Peak Hour Flow Rate – 20.46 L/s

Refer to **Appendix D** for the water demand calculations. Fire flow calculations will be completed during the functional and detailed design of these lands.

Dundalk Northeast Development:

The proposed servicing solution for Dundalk Northeast on the west side will be to connect to the future watermain stubs provided upon completion of Glenelg Phase 2 and White Rose Phase 3 developments. These three locations will be located at the Street 'A' and 'C' road stubs within the Glenelg Phase 2 Development and the Bradley Street extension within the White Rose Development. Connections at these three locations will facilitate a looped distribution network per Township and Ministry of Environment, Conservation and Parks (MECP) Standards. Sizing of internal watermain is subject to a distribution analysis, which will be completed as part of detailed design.

Watermain internal to the site will follow the alignment of the road network similar to Dundalk Northwest complete with individual service connections for each lot and building. Fire hydrants will be spaced as required to provide the necessary fire protection and to meet municipal standards.

The preliminary water distribution layout has been presented in **Figure 4B**.

Preliminary water demands for the Subject Development have been estimated in conjunction with Township Standards that concur with Table 3-1 of the MECP Design Guidelines for Drinking Water Systems. Applicable design criteria have been summarized in Table 3 below.

Applicable design criteria have been summarized in **Table 9** below.

Table 9: Watermain Design Criteria

Criteria	New Development Unit Flow Rates, Triton Engineering (2021)
Average Flow Rate (L/cap/day)	331
Max Day/ Peak Hour Factor	2.75/4.13
Single Detached Density (PPU)	2.66
Townhouse Density (PPU)	2.66

The following water demands have been calculated for the Subject Development per Township Standards identified above:

- Average Daily Flow Rate – 17.86 L/s
- Max Daily Flow Rate – 49.11 L/s
- Peak Hour Flow Rate – 73.76 L/s

Refer to **Appendix D** for the water demand calculations. Fire flow calculations will be completed during the functional and detailed design of these lands.

Dundalk Southeast Development:

The proposed servicing solution for Dundalk Southeast will be to connect to the future watermain provided along the Eco Parkway Extension as well as the future Edgewood Greens Phase 11 watermain. Connection at these locations will facilitate a looped distribution network per Township and Ministry of Environment, Conservation and Parks (MECP) standards. Sizing of internal watermain is subject to a distribution analysis, which will be completed as part of detailed design.

Watermain internal to the site will follow the alignment of the road network complete with individual service connections for each lot and building. Fire hydrants will be spaced as required to provide the necessary fire protection and to meet municipal standards.

The preliminary water distribution layout has been presented in **Figure 4C**.

Preliminary water demands for the Subject Development have been estimated in conjunction with Township Standards that concur with Table 3-1 of the MECP Design Guidelines for Drinking Water Systems. Applicable design criteria have been summarized in Table 3 below.

Applicable design criteria have been summarized in **Table 10** below.

Table 10: Watermain Design Criteria

Criteria	New Development Unit Flow Rates, Triton Engineering (2021)
Average Flow Rate (L/cap/day)	331
Max Day/ Peak Hour Factor	2.75/4.13
Single Detached Density (PPU)	2.66
Townhouse Density (PPU)	2.66

The following water demands have been calculated for the Subject Development per Township Standards identified above:

- Average Daily Flow Rate – 10.84 L/s
- Max Daily Flow Rate – 29.80 L/s
- Peak Hour Flow Rate – 44.76 L/s

Refer to **Appendix D** for the water demand calculations. Fire flow calculations will be completed during the functional and detailed design of these lands.

9.0 STORMWATER MANAGEMENT (SWM) ANALYSIS

9.1 Existing Drainage

9.1.1 Dundalk Northwest Development

The Subject Lands are currently characterized by active agricultural fields and forested area. Based on existing contours, the site exhibits a split drainage pattern with the northeast half draining to the northeast corner of the site and the Southwest half of the site falling towards the southwest. There is approximately a difference of 7 m across the site.

9.1.2 Dundalk Northeast Development

The Subject Land's existing contours indicate that the developable area of the site (110 ha) drains mostly towards the Environmental Protection wetland feature within the centre of the site as well as towards the unnamed tributary to the Foley Drain in the Southeast quadrant of the proposed development. Some of the western site lands drain to a low point approximately 300m east of the Northwest site corner.
West of the site is the CP Rail Trail. This trail represents an elevated linear structure bounding the property line complete with side ditches preventing external flows from the west from entering the development site.

Highway 10 borders the eastern boundary of the site. A portion of external drainage from the lands east of Highway 10 traverses the southeastern portion of the site within the confines of the Unnamed Tributary after passing through a highway culvert. With exception for the flows conveyed through the tributary. Highway 10 also acts as an elevated linear structure complete with side ditches preventing any additional external flows from entering the site.

The Subject Lands lie at the headwaters of two watersheds with site runoff splitting north and south from the Dundalk Northeast Development. No watercourses traverse the property nor do any significant external drainage areas.

9.1.3 Dundalk Southeast Development

The Subject Land's existing contours indicate that the developable area of the site (56.8 ha) drains south towards the Environmental Protection wetland feature in the center of the site. To the west of the site lies the CP Rail Trail and to the east, the Highway 10 corridor. These features represent elevated linear structures bounding the east and west property lines with side ditches preventing external flows from the west and east entering the development site. North of the proposed development gradient generally drains away from the proposed development and west towards the Foley Drain. Lands to the south also drain away from the proposed development and

discharge across the CP Rail Trail to the west at a cross culvert approximately 320m southeast of the proposed development.

The Subject Lands lie at the headwaters of the GRCA. No significant watercourses traverse the property.

9.2 Stormwater Management Design Criteria

The management of stormwater from the Subject Developments must comply with the policies and standards of:

- The Township of Southgate
- Grand River Conservation Authority (GRCA)
- Saugeen Valley Conservation Authority (SVCA)
- The Ministry of the Environment, Conservation and Parks (MECP)

A stormwater management strategy and accompanying recommendations regarding the proposed developments have been included below:

- Water Quantity Control
  - Control of the post-development peak flows to pre-development levels for all storms up to and including the 100-year at the selected point of interest.

- Water Quality Control
  - "Enhanced Protection" per MECP.

- Erosion Control
  - 24- hour detention of the 25 mm event runoff.

- Water Balance
  - Best effort to achieve post-development annual infiltration volumes at or above pre-development levels.

- Development Standard
  - Urban cross section complete with 5-year storm sewer system; and
  - Minor/major drainage system to convey frequent and infrequent rainfall/runoff events.

- External Drainage Management
  - Manage the external drainage entering the site by safely routing these flows through or around the development to a suitable outlet.

9.2.1 Dundalk Northwest Development

The Dundalk Northwest Development will be constructed to a fully urbanized system complete with curb and gutter and storm sewers. A dual drainage approach will consist of minor and major stormwater flow routes to ensure adequate conveyance for runoff. The minor drainage system will consist of storm sewers and catchbasins sized to convey the 5-year design storm event. The major drainage system will provide overland stormwater flow routes with the road allowance. Much of the site will have flows form the development directed during both the minor and major drainage system towards the proposed Stormwater Management (SMW) blocks.

The above criteria will be utilized to appropriately size the required Stormwater Management Blocks. It is anticipated that two (2) stormwater management (SWM) blocks will be required to support the Dundalk Northwest. Based on the existing contours, the low points of the Dundalk Northwest are in the southwest and northeast quadrants of the site. As there is no defined watercourse near the development the outlets from the two (2) SWM ponds will direct flows to the roadside ditches and ultimately existing cross culverts along County Road 9. All existing municipal infrastructure will need to be assessed for condition and capacity to confirm the proposed stormwater management strategy.

For conservative purposes, a land allowance of 8%-10% of the contributing drainage areas will be allotted to the SWM block to ensure sufficient space is allocated on the Draft Plan. Refinement of the block sizing will occur as part of future planning applications; however, a preliminary location has been illustrated on the attached Concept Plan.

Refer to **Figure 5A** for the Storm Servicing Plan.

9.2.2 Dundalk Northeast Development

The Dundalk Northeast Development will be constructed to a fully urbanized system complete with curb and gutter and storm sewers. A dual drainage approach will consist of minor and major stormwater flow routes to ensure adequate conveyance for runoff. The minor drainage system will consist of storm sewers and catchbasins sized to convey the 5-year design storm event. The major drainage system will provide overland stormwater flow routes with the road allowance. Much of the site will have flows form the development directed during both the minor and major drainage system towards the proposed Stormwater Management (SMW) block.

The above criteria will be utilized to appropriately size the required Stormwater Management Blocks. It is anticipated that two (2) to three (3) stormwater management (SWM) blocks will be required to support the Subject Development. Based on the existing contours, the low points of the Subject Development are located mainly in the central areas of the site discharging to the north and south of the development.

For conservative purposes, a land allowance of 8%-10% of the contributing drainage areas will be allotted to the SWM blocks to ensure sufficient space is allocated on the Draft Plan. Refinement of the block sizing will occur as part of future planning applications; however, preliminary locations have been illustrated on the attached Concept Plan.

Refer to Figure **5B** for the Storm Servicing Plan.

Since the site lies at the boundary of the regulatory boundary of the Saugeen Valley Conservation Authority (SVCA) and the Grand River Conservation Authority (GRCA), only one defined watercourses can be identified traversing the southeast quadrant of the property. To maintain the current stormwater runoff conditions the site will be designed to maintain a split outlet drainage pattern. To ensure that post-development volumes and peak flows meet pre-development conditions within the two regulatory boundaries, it will be necessary to specify multiple outlets from the proposed SWM Facilities to the wetland and watercourse features across the site.

Surrounding topography to the west, north and south of the site generally falls away from the site. The CP Rail Trial and Highway 10 presents elevated and ditched obstacles to flows entering

from the west and east. To the south a portion of the site is bounded by existing residential rear lots, whose drainage is captured into an existing storm sewer system. The Unnamed Tributary to the Foley Drain conveying runoff through the Site.

9.2.3 Dundalk Southeast Development

The Dundalk Southeast Internal Development will be constructed to a fully urbanized system complete with curb and gutter and storm sewers. A dual drainage approach will consist of minor and major stormwater flow routes to ensure adequate conveyance for runoff. The minor drainage system will consist of storm sewers and catchbasins sized to convey the 5-year design storm event. The major drainage system will provide overland stormwater flow routes with the road allowance. Much of the site will have flows form the development directed during both the minor and major drainage system towards the proposed Stormwater Management (SMW) blocks.

The above criteria will be utilized to appropriately size the required Stormwater Management Blocks. It is anticipated that two (2) stormwater management (SWM) blocks will be required to support the Dundalk Southeast. Based on the existing contours, the low point of Dundalk Southeast is in the south center section of the site. The proposed SWM ponds will discharge from the east and west to the central EP Lands. There is a poorly defined watercourse originating from the sites EP lands that discharges to a wetland area south of the proposed development. This wetland ultimately reliefs through a CP Rail Trail cross culvert entering a more well-defined tributary to the Foley Drain and ultimately the Grand River. Existing municipal infrastructure will need to be assessed for condition and capacity to confirm the proposed stormwater management strategy.

For conservative purposes, a land allowance of 8%-10% of the contributing drainage areas will be allotted to the SWM block to ensure sufficient space is allocated on the Draft Plan. Refinement of the block sizing will occur as part of future planning applications; however, a preliminary location has been illustrated on the attached Concept Plan.

Refer to **Figure 5C** for the Storm Servicing Plan.

9.3 Water Balance

The use of Low Impact Development (LID) measures to aid in achieving water balance requirements and stormwater quality/quantity control will be investigated during Draft Plan Approval works and as per hydrogeological recommendations.

It is anticipated, based on a preliminary review, that various opportunities exist to implement LID techniques to achieve the stormwater management objectives for the sites. At this stage it is premature to design the LID's, as there is insufficient information for the site (i.e., soil types, groundwater elevation, and ownership). As part of the Draft Plan Approval/detailed design, this information will be obtained, and LID options will be evaluated to determine feasibility and suitability for the developments.

10.0 UTILITIES

The developments will be serviced with natural gas, telephone, cable TV and hydro. The design of such utilities will be coordinated with the local utility companies servicing the Township are proposed to follow the alignment of the internal road network, with individual service connections to each lot and building.

11.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing, the proposed developments are not anticipated to have a significant impact on the boundary road network, they can be appropriately serviced with municipal sewage and water services, stormwater runoff from the sites will be managed appropriately and the community has existing available utilities to service the site.

Should you have any questions or concerns, please contact the undersigned.

Sincerely,

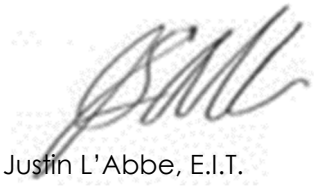
C.F. CROZIER & ASSOCIATES INC.

Brittany Robertson, P.Eng.
Associate, Manager of Land Development

C.F. CROZIER & ASSOCIATES INC.

Madeleine Ferguson, P.Eng.
Manager of Transportation

C.F. CROZIER & ASSOCIATES INC.



Justin L'Abbe, E.I.T.
Land Development

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Appendix A

ITE Trip Generation Manual, 10th Edition Excerpts

Land Use: 130
Industrial Park

Description

An industrial park contains several individual industrial or related facilities. It is characterized by a mix of manufacturing, service, and warehouse facilities with a wide variation in the proportion of each type of use from one location to another. Many industrial parks contain highly diversified facilities. Some parks in the database have a large number of small businesses and others have one or two dominant industries. General light industrial (Land Use 110) and manufacturing (Land Use 140) are related uses.

Additional Data

The sites were surveyed in the 1980s, the 2000s, 2010s, and the 2020s in California, Georgia, New Jersey, Massachusetts, New York, Ontario (CAN), and Pennsylvania.

Source Numbers

106, 162, 184, 251, 277, 422, 706, 747, 753, 937, 1032, 1070

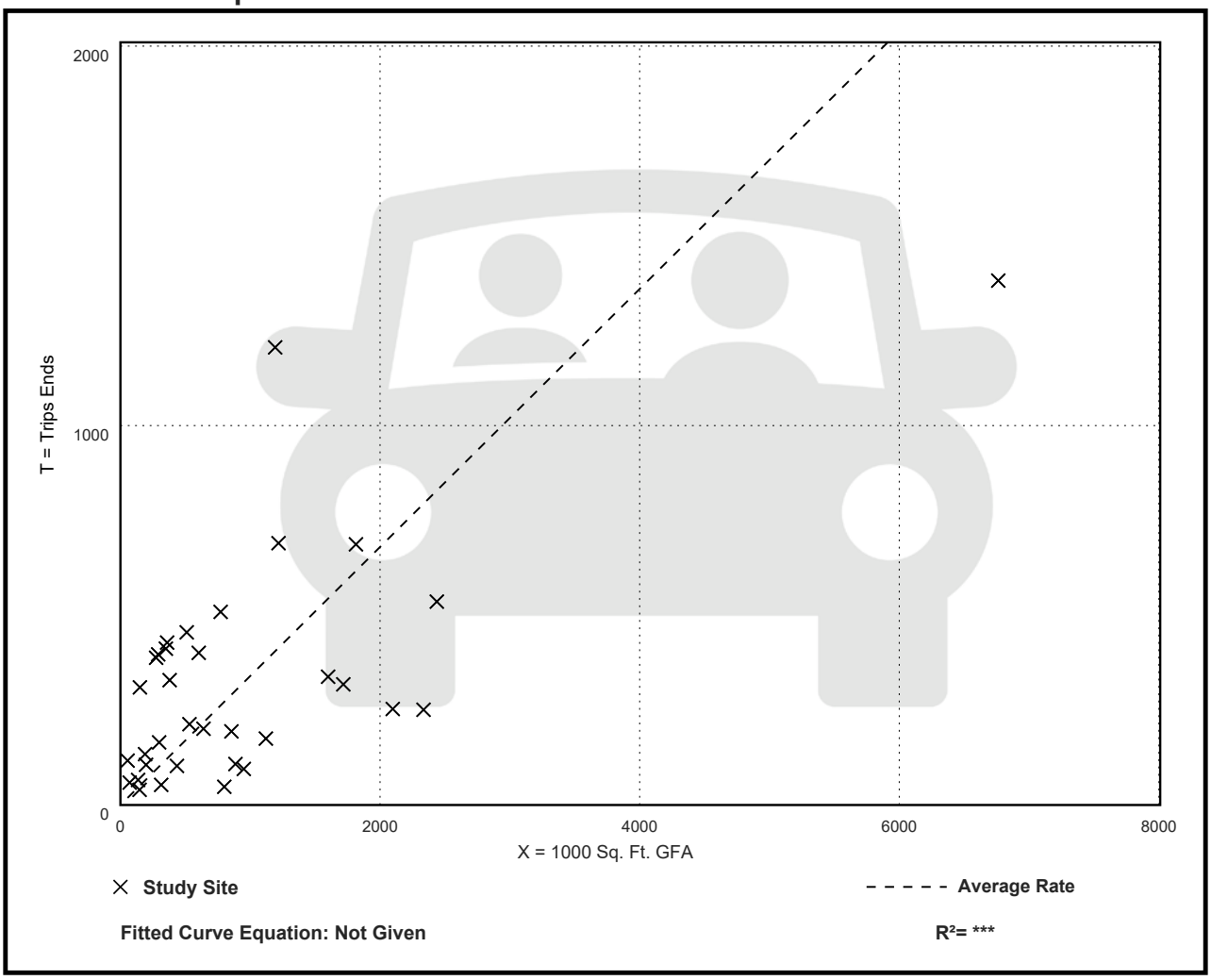
Industrial Park
(130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 34
Avg. 1000 Sq. Ft. GFA: 956
Directional Distribution: 81% entering, 19% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.06 - 2.13	0.33

Data Plot and Equation



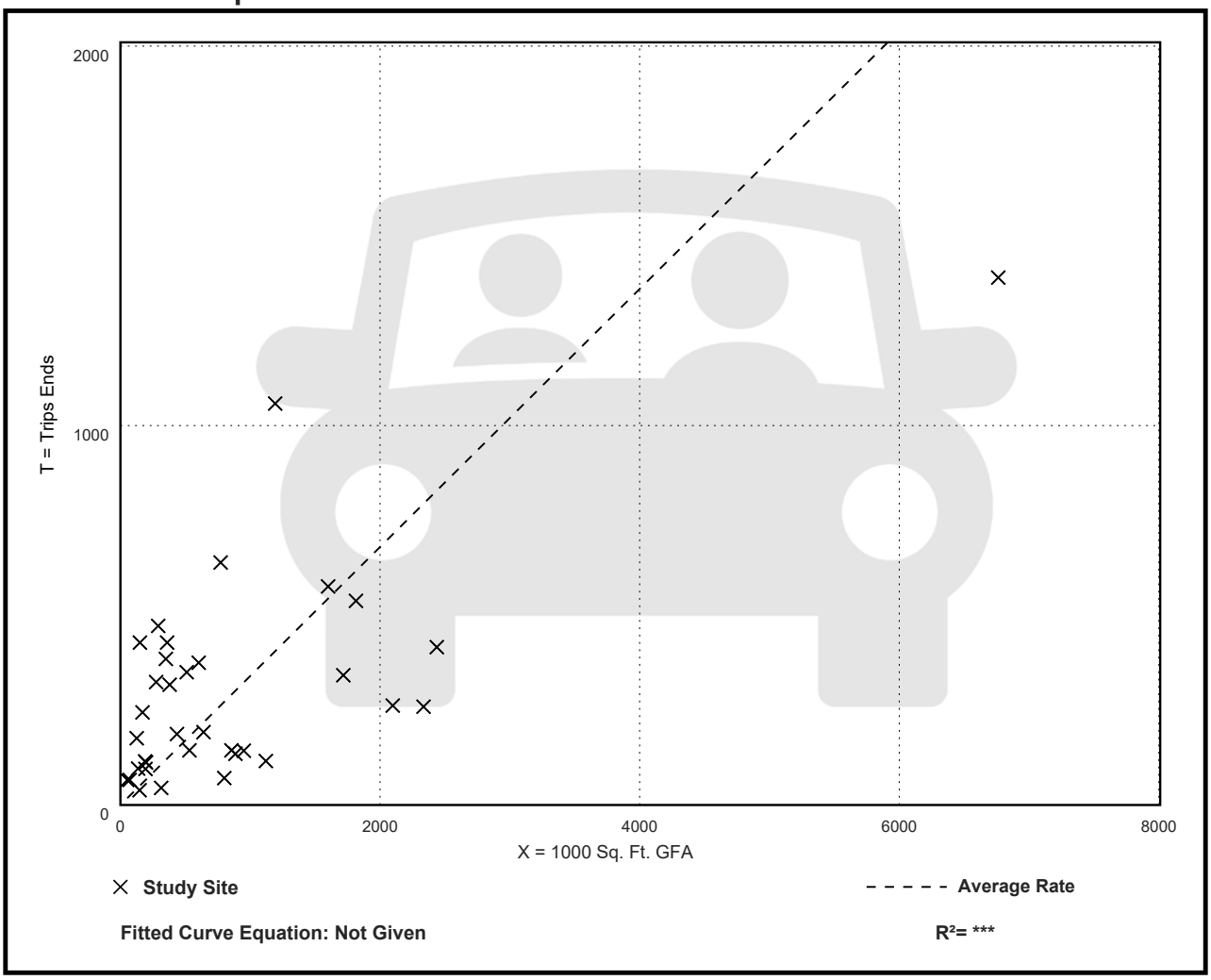
Industrial Park
(130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 35
Avg. 1000 Sq. Ft. GFA: 899
Directional Distribution: 22% entering, 78% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.09 - 2.85	0.36

Data Plot and Equation



Land Use: 210
Single-Family Detached Housing

Description

A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.

Specialized Land Use

Data have been submitted for several single-family detached housing developments with homes that are commonly referred to as patio homes. A patio home is a detached housing unit that is located on a small lot with little (or no) front or back yard. In some subdivisions, communal maintenance of outside grounds is provided for the patio homes. The three patio home sites total 299 dwelling units with overall weighted average trip generation rates of 5.35 vehicle trips per dwelling unit for weekday, 0.26 for the AM adjacent street peak hour, and 0.47 for the PM adjacent street peak hour. These patio home rates based on a small sample of sites are lower than those for single-family detached housing (Land Use 210), lower than those for single-family attached housing (Land Use 251), and higher than those for senior adult housing -- single-family (Land Use 251). Further analysis of this housing type will be conducted in a future edition of *Trip Generation Manual*.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

For 30 of the study sites, data on the number of residents and number of household vehicles are available. The overall averages for the 30 sites are 3.6 residents per dwelling unit and 1.5 vehicles per dwelling unit.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Arizona, California, Connecticut, Delaware, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Minnesota, Montana, New Jersey, North Carolina, Ohio, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, Virginia, and West Virginia.

Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 869, 903, 925, 936, 1005, 1007, 1008, 1010, 1033, 1066, 1077,1078, 1079

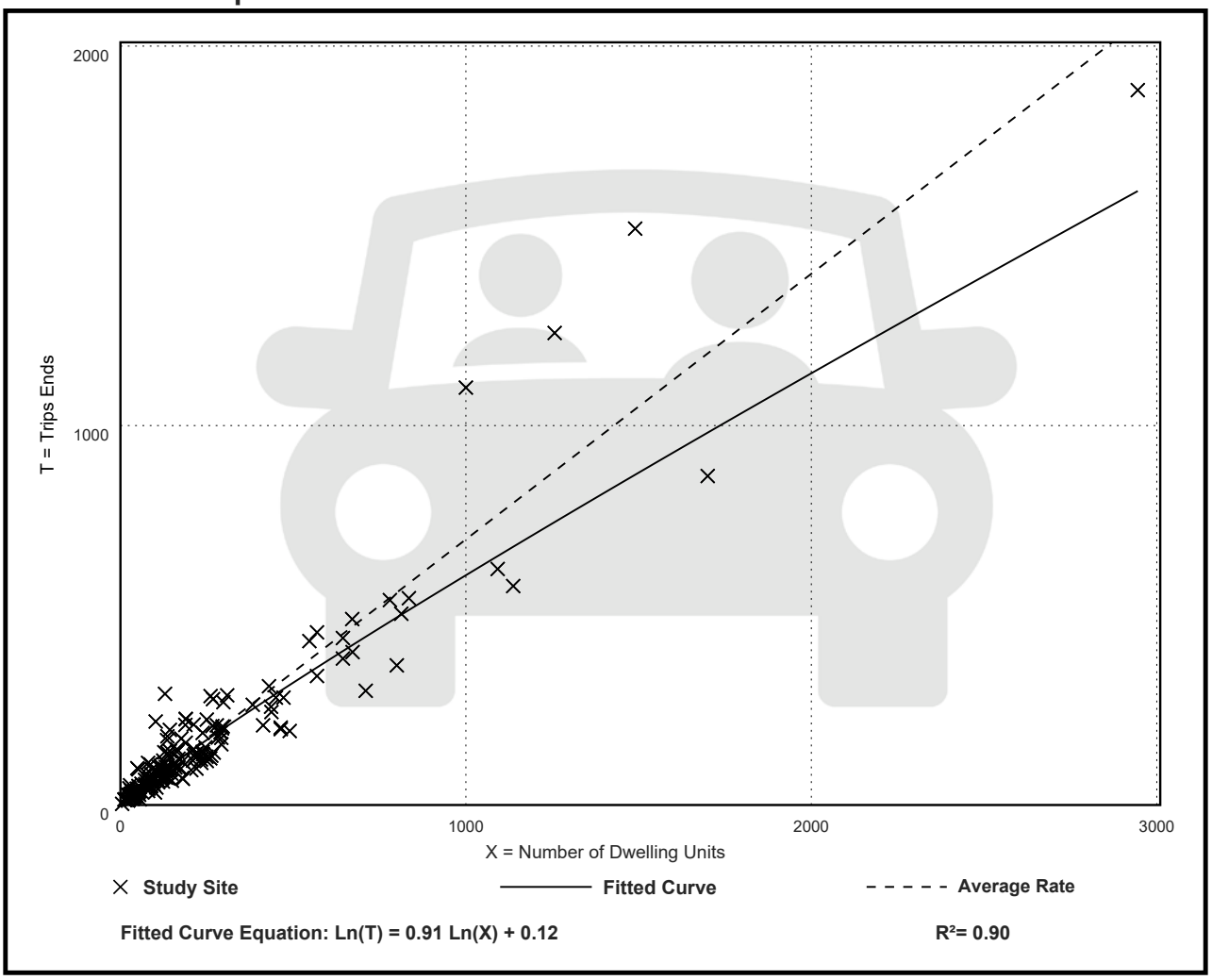
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



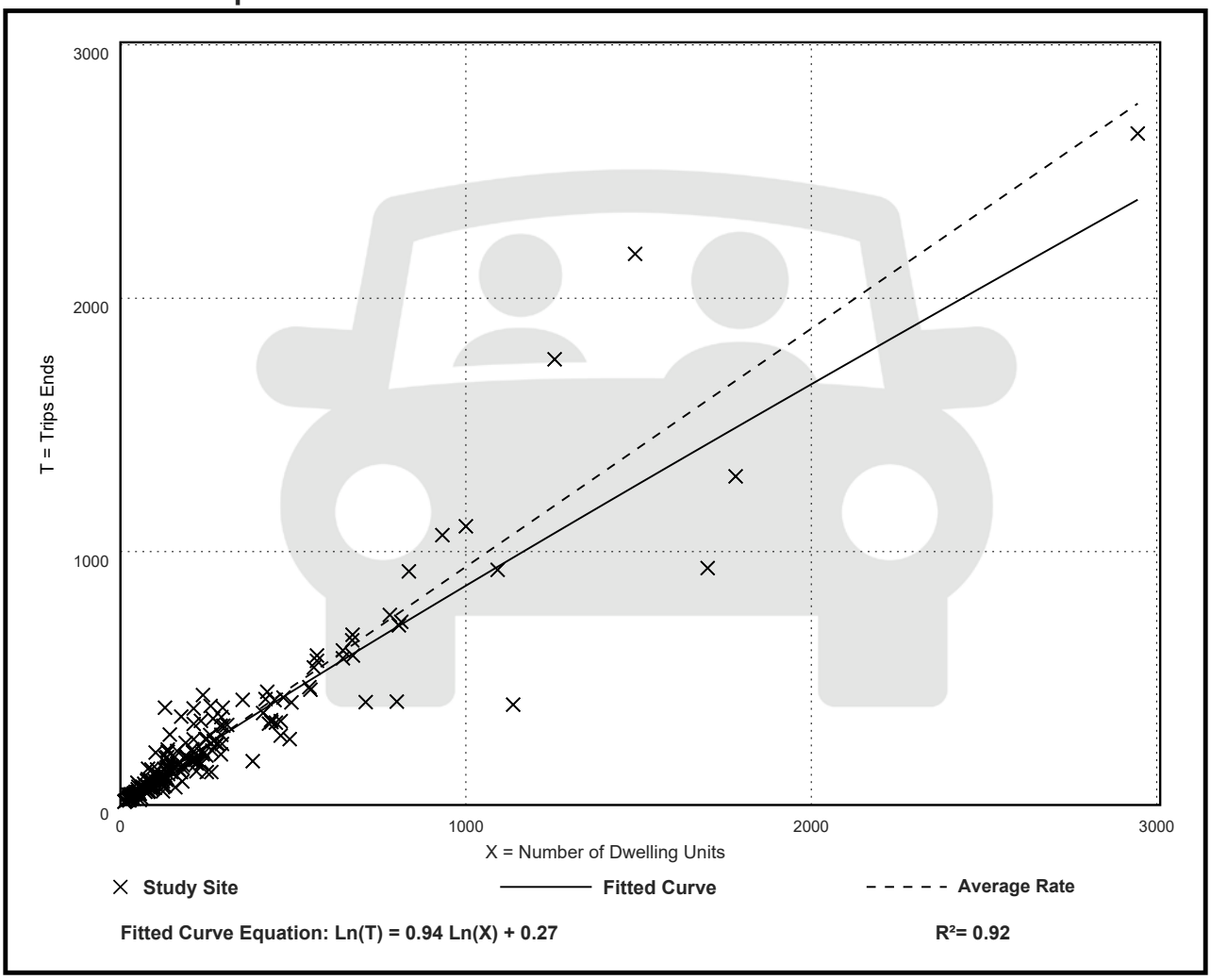
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



Land Use: 220
Multifamily Housing (Low-Rise)

Description

Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.

- A walkup apartment typically is two or three floors in height with dwelling units that are accessed by a single or multiple entrances with stairways and hallways.

- A mansion apartment is a single structure that contains several apartments within what appears to be a single-family dwelling unit.

- A fourplex is a single two-story structure with two matching dwelling units on the ground and second floors. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

- A stacked townhouse is designed to match the external appearance of a townhouse. But, unlike a townhouse dwelling unit that only shares walls with an adjoining unit, the stacked townhouse units share both floors and walls. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

Multifamily housing (mid-rise) (Land Use 221), multifamily housing (high-rise) (Land Use 222), affordable housing (Land Use 223), and off-campus student apartment (low-rise) (Land Use 225) are related land uses.

Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Additional Data

For the three sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.72 residents per occupied dwelling unit.

For the two sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96.2 percent of the total dwelling units were occupied.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip

generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

For the three sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.72 residents per occupied dwelling unit.

It is expected that the number of bedrooms and number of residents are likely correlated to the trips generated by a residential site. To assist in future analysis, trip generation studies of all multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex).

The sites were surveyed in the 1980s, the 1990s, the 2000s, the 2010s, and the 2020s in British Columbia (CAN), California, Delaware, Florida, Georgia, Illinois, Indiana, Maine, Maryland, Massachusetts, Minnesota, New Jersey, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, and Washington.

Source Numbers

188, 204, 237, 300, 305, 306, 320, 321, 357, 390, 412, 525, 530, 579, 583, 638, 864, 866, 896, 901, 903, 904, 936, 939, 944, 946, 947, 948, 963, 964, 966, 967, 1012, 1013, 1014, 1036, 1047, 1056, 1071, 1076

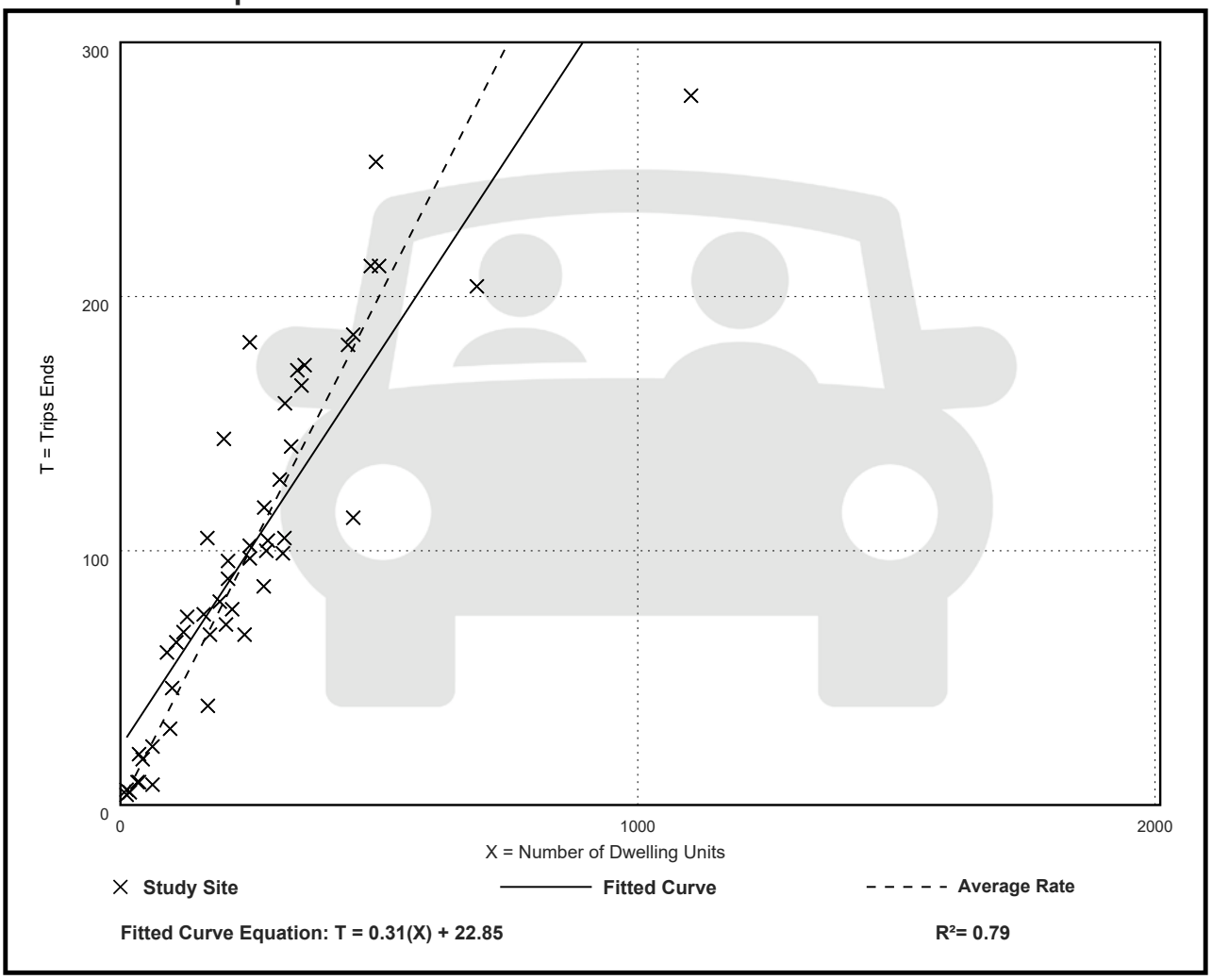
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 49
Avg. Num. of Dwelling Units: 249
Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



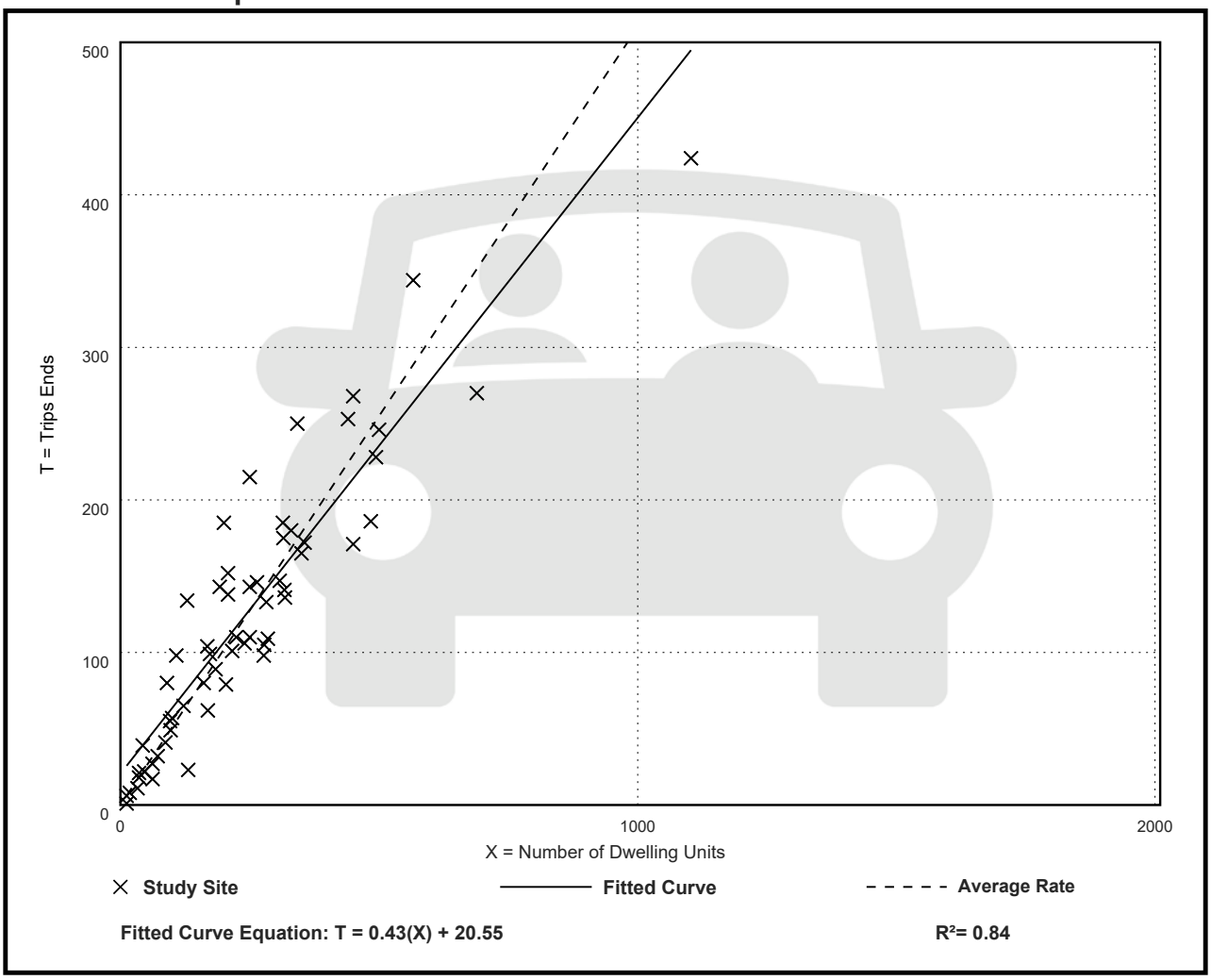
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 59
Avg. Num. of Dwelling Units: 241
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



Land Use: 520
Elementary School

Description

An elementary school is a public school that typically serves students attending kindergarten through the fifth or sixth grade. An elementary school is usually centrally located in a residential community to facilitate student access. Bus service is commonly provided to students living beyond a specified distance from the school. Middle school/junior high school (Land Use 522), private school (K-8) (Land Use 530), private school (K-12) (Land Use 532), charter elementary school (Land Use 536), and charter school (K-12) (Land Use 538) are related uses.

Additional Data

Elementary school students generally used school buses more than regular transit and were dropped off and picked up more than high school students, who were apt to walk longer distances, ride bicycles, or, in some cases, drive to school. The percentage of students at the sites who were transported to school via bus varied considerably. Some sites experienced higher than average trip rates because many students did not utilize the available school bus service. Due to the varied transit and school bus usage at these sites, it is desirable that future studies report additional detail on the percentage of students who were bused to school and the percentage that were dropped off and picked up.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alabama, Arizona, British Columbia (CAN), California, Connecticut, Florida, Hawaii, Minnesota, Montana, Nevada, New York, Oregon, Texas, Utah, Washinton, and West Virginia.

Source Numbers

186, 383, 390, 395, 533, 536, 572, 579, 583, 609, 611, 612, 613, 632, 707, 852, 856, 858, 866, 877, 878, 896, 940, 1039, 1048, 1067, 1083

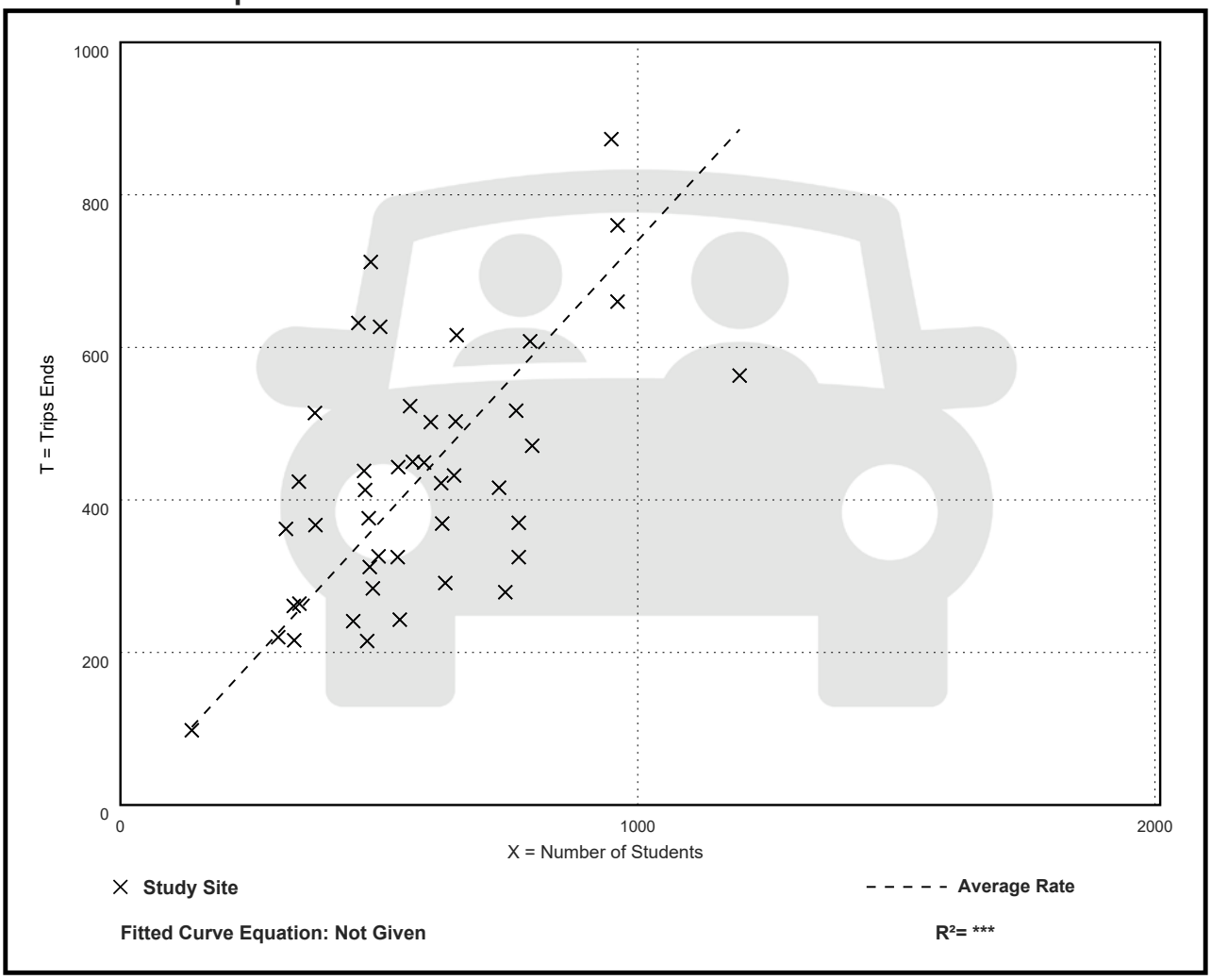
Elementary School
(520)

Vehicle Trip Ends vs: Students
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 44
Avg. Num. of Students: 575
Directional Distribution: 54% entering, 46% exiting

Vehicle Trip Generation per Student

Average Rate	Range of Rates	Standard Deviation
0.74	0.38 - 1.47	0.25

Data Plot and Equation



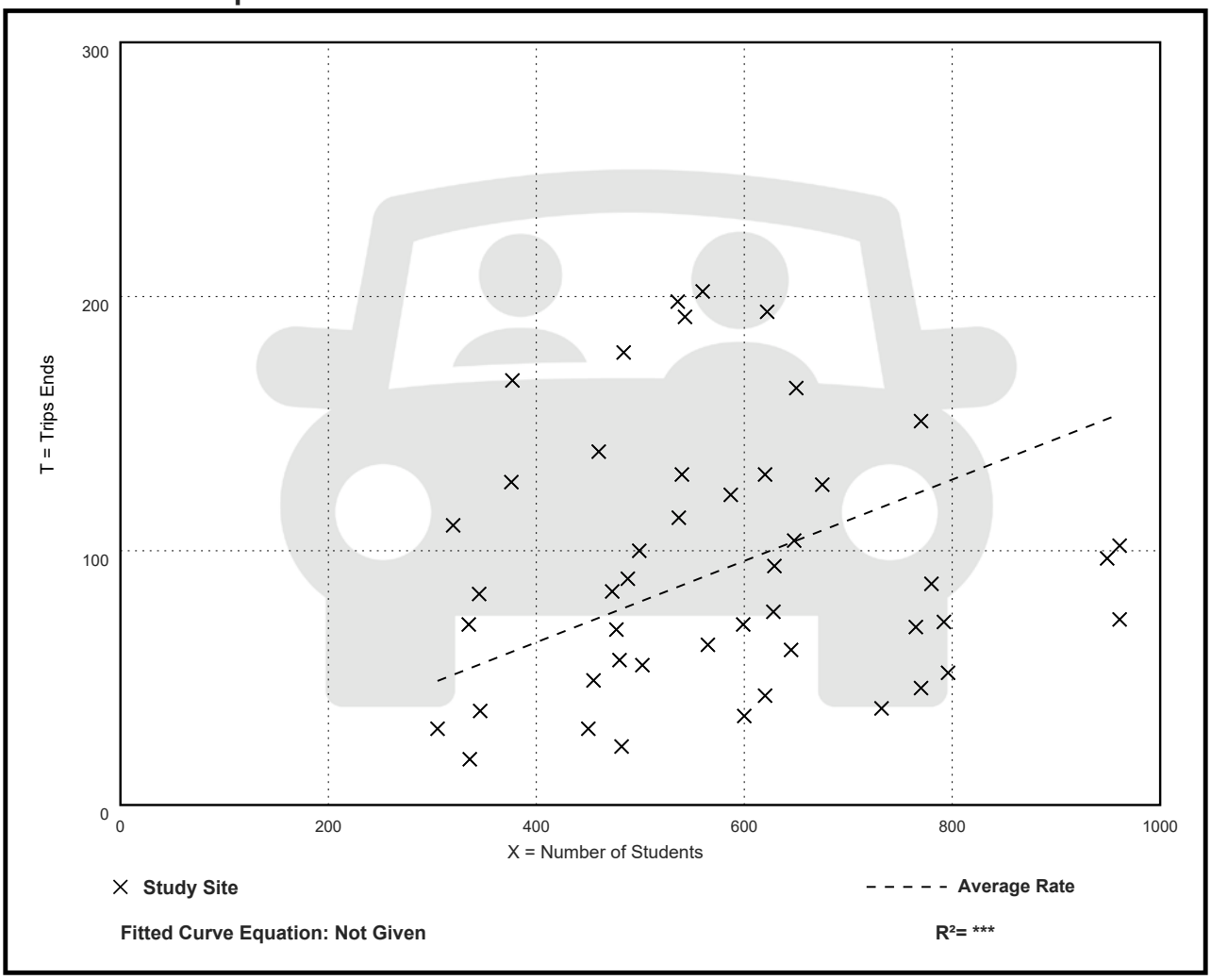
Elementary School
(520)

Vehicle Trip Ends vs: Students
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 47
Avg. Num. of Students: 576
Directional Distribution: 46% entering, 54% exiting

Vehicle Trip Generation per Student

Average Rate	Range of Rates	Standard Deviation
0.16	0.05 - 0.44	0.10

Data Plot and Equation



Land Use: 820
Shopping Center (>150k)

Description

A shopping center is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Each study site in this land use has at least 150,000 square feet of gross leasable area (GLA). It often has more than one anchor store. Various names can be assigned to a shopping center within this size range, depending on its specific size and tenants, such as community center, regional center, superregional center, fashion center, and power center.

A shopping center of this size typically contains more than retail merchandising facilities. Office space, a movie theater, restaurants, a post office, banks, a health club, and recreational facilities are common tenants.

A shopping center of this size can be enclosed or open-air. The vehicle trips generated at a shopping center are based upon the total GLA of the center. In the case of a smaller center without an enclosed mall or peripheral buildings, the GLA is the same as the gross floor area of the building.

The 150,000 square feet GLA threshold value between community/regional shopping center and shopping plaza (Land Use 821) is based on an examination of trip generation data. For a shopping plaza that is smaller than the threshold value, the presence or absence of a supermarket within the plaza has a measurable effect on site trip generation. For a shopping center that is larger than the threshold value, the trips generated by its other major tenants mask any effects of the presence or absence of an on-site supermarket.

Shopping plaza (40-150k) (Land Use 821), strip retail plaza (<40k) (Land Use 822), and factory outlet center (Land Use 823) are related uses.

Additional Data

Many shopping centers—in addition to the integrated unit of shops in one building or enclosed around a mall—include outparcels (peripheral buildings or pads located on the perimeter of the center adjacent to the streets and major access points). These buildings are typically drive-in banks, retail stores, restaurants, or small offices. Although the data herein do not indicate which of the centers studied include peripheral buildings, it can be assumed that some of the data show their effect.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), California, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky,

Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Texas, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

Source Numbers

77, 110, 154, 156, 159, 190, 199, 202, 204, 213, 251, 269, 294, 295, 299, 304, 305, 307, 308, 309, 311, 314, 315, 316, 317, 319, 365, 385, 404, 414, 423, 442, 446, 562, 629, 702, 715, 728, 868, 871, 880, 899, 912, 926, 946, 962, 973, 974, 978, 1034, 1040, 1067

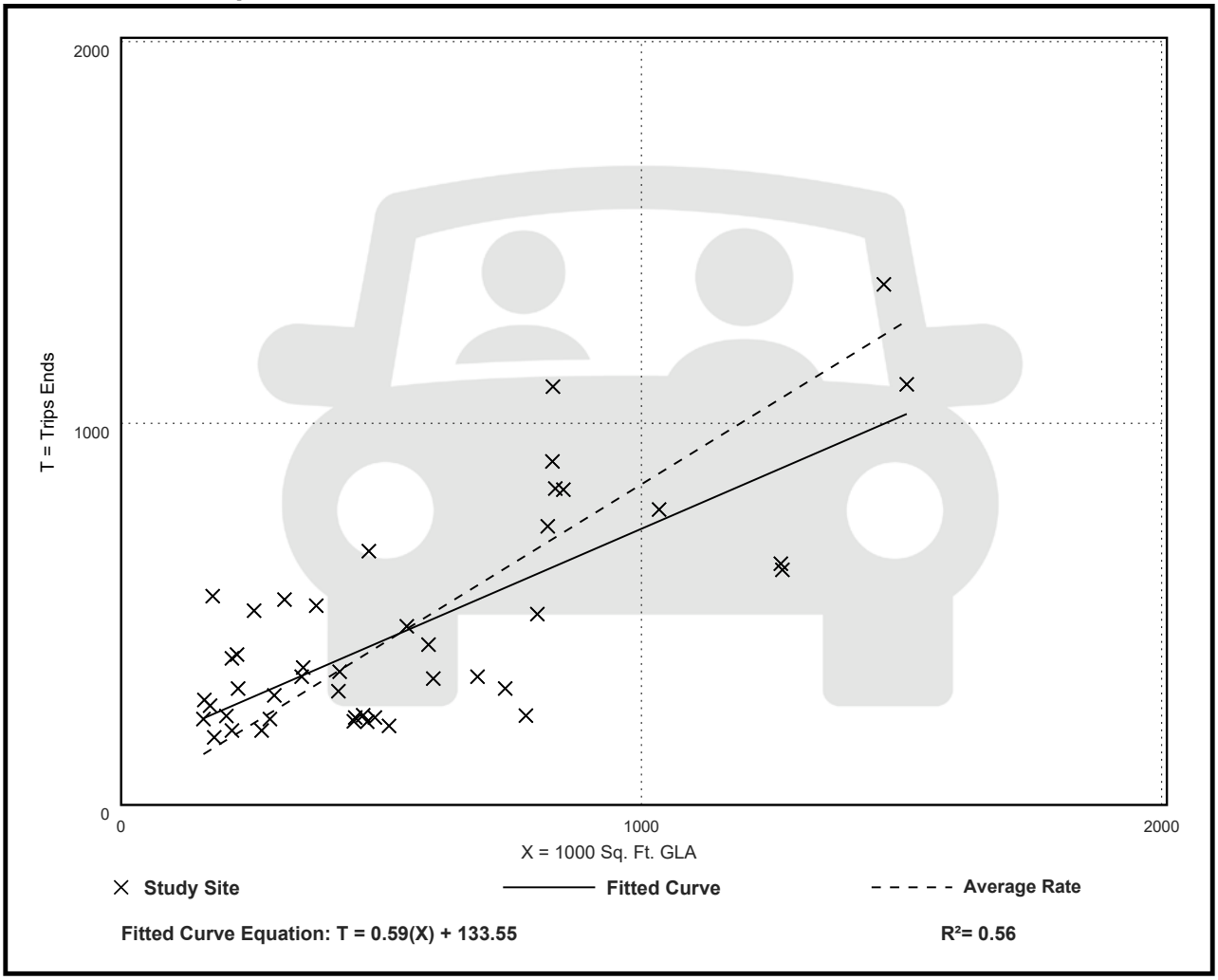
Shopping Center (>150k)
(820)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 44
Avg. 1000 Sq. Ft. GLA: 546
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
0.84	0.30 - 3.11	0.42

Data Plot and Equation



Fitted Curve Equation: T = 0.59(X) + 133.55

R^2= 0.56

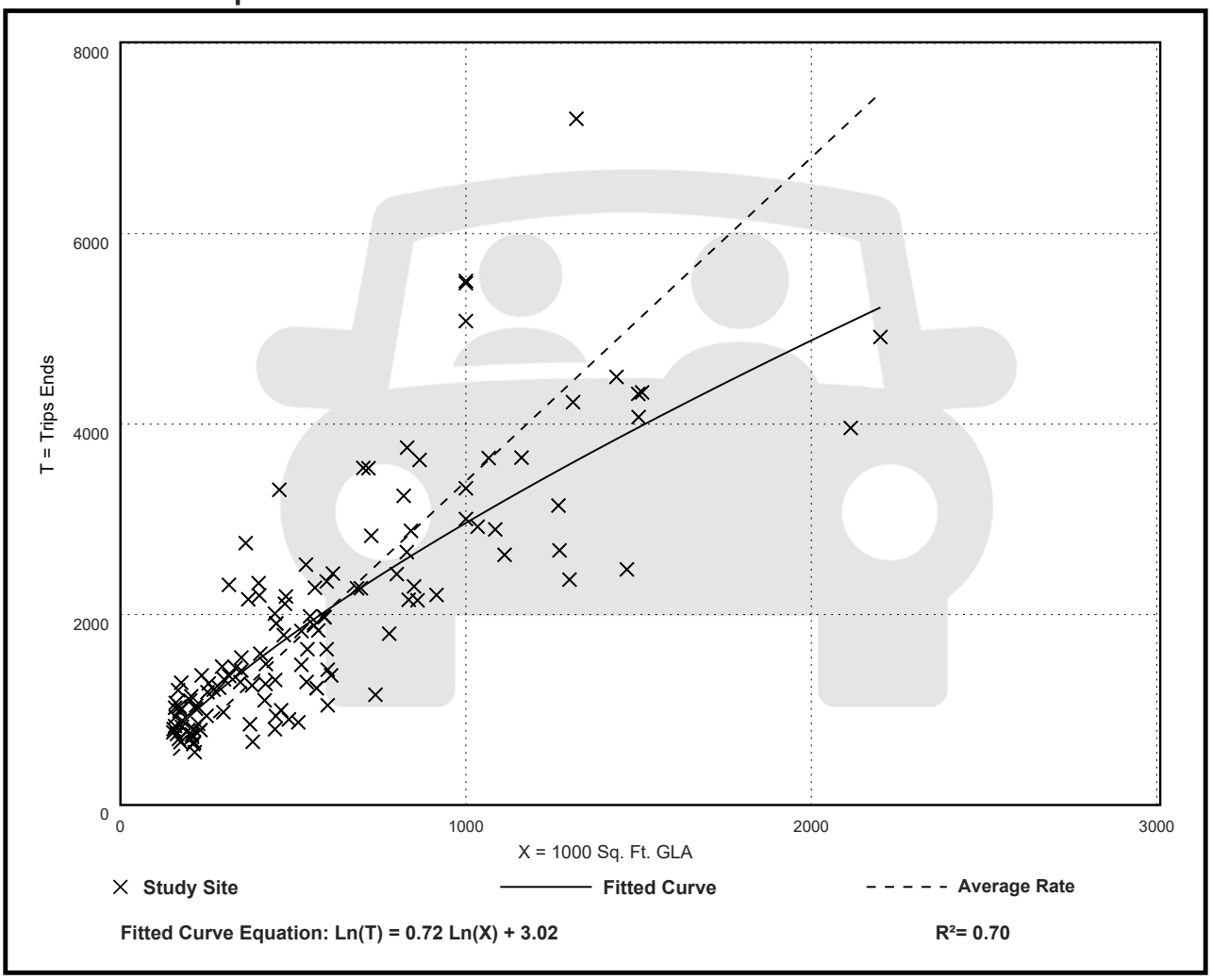
Shopping Center (>150k)
(820)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 126
Avg. 1000 Sq. Ft. GLA: 581
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.40	1.57 - 7.58	1.26

Data Plot and Equation



Appendix B

2021 Reserve Capacity Study

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

105 Queen Street West, Unit 14
Fergus
Ontario N1M 1S6
Tel: (519) 843-3920
Fax: (519) 843-1943
Email: info@tritoneng.on.ca

ORANGEVILLE • FERGUS • GRAVENHURST

April 14, 2021

Township of Southgate
R.R. #1
185667 Grey Road 9
DUNDALK, Ontario
N0C 1B0

ATTENTION: Jim Ellis,
Public Works Manager

RE: TOWNSHIP OF SOUTHGATE
DUNDALK WATER SUPPLY AND
SEWAGE TREATMENT SYSTEMS
HYDRAULIC RESERVE CAPACITY
OUR FILE: A4160(21)-R04

Dear Sir:

The attached tables outline the 2021 reserve capacity calculations for the water supply and sewage treatment systems in Dundalk. The reserve capacities have been calculated in accordance with Ministry of Environment and Conservation and Parks (MECP) guidelines. **139** new residential units were occupied and connected to the municipal systems in Dundalk in 2020.

Table 3 provides a summary of Committed Developments which include Flato Phases 3-6, Flato Glenelg Development Phase 1 and the Flato West Apartment Building, totalling **631** equivalent residential units (ERUs). As Committed Development, these ERUs will not come out of the Uncommitted Reserve Capacity figures indicated on Tables 1 and Table 2. Table 3 also outlines the various potential developments that have been granted Draft Plan Approval, however have not been granted allocation.

Water System:

The three (3) year average maximum day demand of the water system increased from 786m^3/d to **918m^3/d** over the past year. The 2021 uncommitted reserve capacity of the water system is **1,526 ERU**. This is based on the Townships' amount of water taking permitted by the Permit to Take Water and draft plan approved/committed developments as outlined in Table 3. The Permit to Take Water, indicates an allowable water taking of 2,817m^3/day.

Refer to Table 1 for additional information regarding water system reserve capacity calculations.

Sewage Treatment Facility:

Table 2 summarizes the sewage treatment reserve capacity calculations for 2021. The three-year annual average day flow decreased from 1,129 m^3/d to **1,127m^3/d**. The 2020 uncommitted reserve capacity for the sewage treatment facility is **127** new development ERUs.

Refer to Table 2 for additional information regarding sewage treatment system reserve capacity calculations.

Extraneous Flow:

Additionally, in conjunction with the reserve capacity calculations, we have completed a high-level assessment of the extraneous flows within the Dundalk sewage collection system. This assessment compares the precipitation, temperature, average day demand of water and the average day sewage flow measured at the WWTP on a monthly basis. The results indicate that the extraneous flows over and above the expected amount within a typical system is, on average, **356m^3/day**, which equates to an estimated **383 ERUs**. The relationship between the wastewater flows, precipitation and temperature is indicative of a system that is subject to groundwater infiltration, as opposed to direct inflow. This is based on peaking of wastewater flows noted during the spring melt (i.e. March & April) with little correlation noted to times of high precipitation but lower groundwater levels (i.e. July & August). Sump pump connections are likely a significant contributor.

Recommendation:

Following Council's review and adoption of the attached report, we would recommend that a copy of the report be forwarded to the MECP District Office in Owen Sound and the Grey County Planning Department. We trust you will find the enclosed to be in order. Should you have any questions, please do not hesitate to contact this office.

Yours very truly,

TRITON ENGINEERING SERVICES LIMITED

Dustin Lyttle, P. Eng.

cc: Dave Milliner, Township of Southgate
Clinton Stredwick, Township of Southgate
Bev Fisher, Township of Southgate

TABLE 1
TOWNSHIP OF SOUTHGATE
2021 RESERVE CAPACITY
DUNDALK WATER SYSTEM

	DESCRIPTION	2020
1	Available Capacity[1]	2,817
2	Max Day Flow (m^3/d)[2]	918
3	Reserve Capacity (m^3/d) (1) - (2)	1,899
4	Serviced Households[3]	1,067
5	Persons Per Existing Residential Unit (2016 Census Data)	2.60
6	Population Served (4) x (5)	2,774
7	Maximum Day Per Capita Flow (m^3/d) (2) ÷ (6)	0.331
8	Additional Population that can be Served (3) ÷ (7)	5,739
9	Person Per New Equivalent Residential Unit (2017 DC Background Study)	2.66
10	Additional ERUs that can be served. (8) ÷ (9)	2,157
11	Committed Development ERUs (Table 3)	631
12	**Uncommitted Reserve Capacity (ERUs)** **(10) - (11)**	**1,526**

[1] Available Capacity is based on lesser of Firm Capacity or Permit to Take Water. Firm capacity is 2,817m^3/day, PTTW is 2,817m^3/d, Well Production is 4,778m^3/day.

[2] Max day flow is the average of the maximum day flows from 2018, 2019 and 2020 (742, 913 and 905m^3/d respectively). Maximum day flows have been adjusted based on extenuating circumstances.

[3] Serviced households as reported in the 2020 Annual Water Report.

TABLE 2
TOWNSHIP OF SOUTHGATE
2021 RESERVE CAPACITY
DUNDALK SEWAGE TREATMENT FACILITY

	DESCRIPTION	2020
1	Design Capacity of Sewage Treatment Facility (m^3/d)	1,832
2	Average Day Flow[1] (m^3/d) (Average of 2018, 2019 and 2020 Average Day Flows)	1,127
3	Reserve Capacity (m^3/d) (1) - (4)	705
4	Average New Development Per Capita Flow[2] (m^3/d)	0.350
5	Additional Population that can be Served (3) ÷ (4)	2,015
6	Person Per Equivalent Residential Unit (2017 DC Background Study)	2.66
7	ERU Flow Rate (m^3/d) (4) x (6)	0.931
8	Additional ERUs that can be Served (5) ÷ (6)	758
9	Committed Development ERUs (Table 3)	631
10	**Uncommitted Reserve Capacity (ERUs) (7) - (8)**	**127**

[1] Average of the average day flows in 2018, 2019 and 2020 (1,105, 1,114 and 1,161m^3/day respectively).

[2] As determined by new development flow analysis supported by flow monitoring program.

TABLE 3
TOWNSHIP OF SOUTHGATE
2021 RESERVE CAPACITY
SUMMARY OF DUNDALK DEVELOPMENTS

COMMITTED DEVELOPMENTS	TOTAL UNITS	UNITS OCCUPIED IN 2020	REMAINING UNITS AT END OF 2020
White Rose (Phase 1 & 2)	66	52	14
Flato East (Phase 2B)	38	38	0
Flato North (Phase 2A)	72	72	0
Flato North (Phase 3)	46	8	38
Flato North (Phase 4)	22	0	22
Flato North (Phase 5)	59	0	59
Flato North (Phase 6)	68	0	68
Flato Glenelg (Phase 1)	183	0	183
Flato West Block 75 (Phase 2) Apartment Building[1]	56	0	56
Flato East (7, 8 & 10)	188	0	188
SUB-TOTAL		**170**	**628**
INFILL LOTS[2]	3		3
TOTAL COMMITTED UNITS			**631**

UNCOMMITTED DEVELOPMENT (DRAFT PLAN APPROVED)	TOTAL UNITS	
White Rose (Phase 3)	101	
Flato East (Phase 9)	47	
Flato East (11, 12 & 13)	227	
SUB-TOTAL	**375**	

[1] Apartment units based on assumption that each unit is 0.7 ERU.

[2] 3 Infill Lots allocated annually.

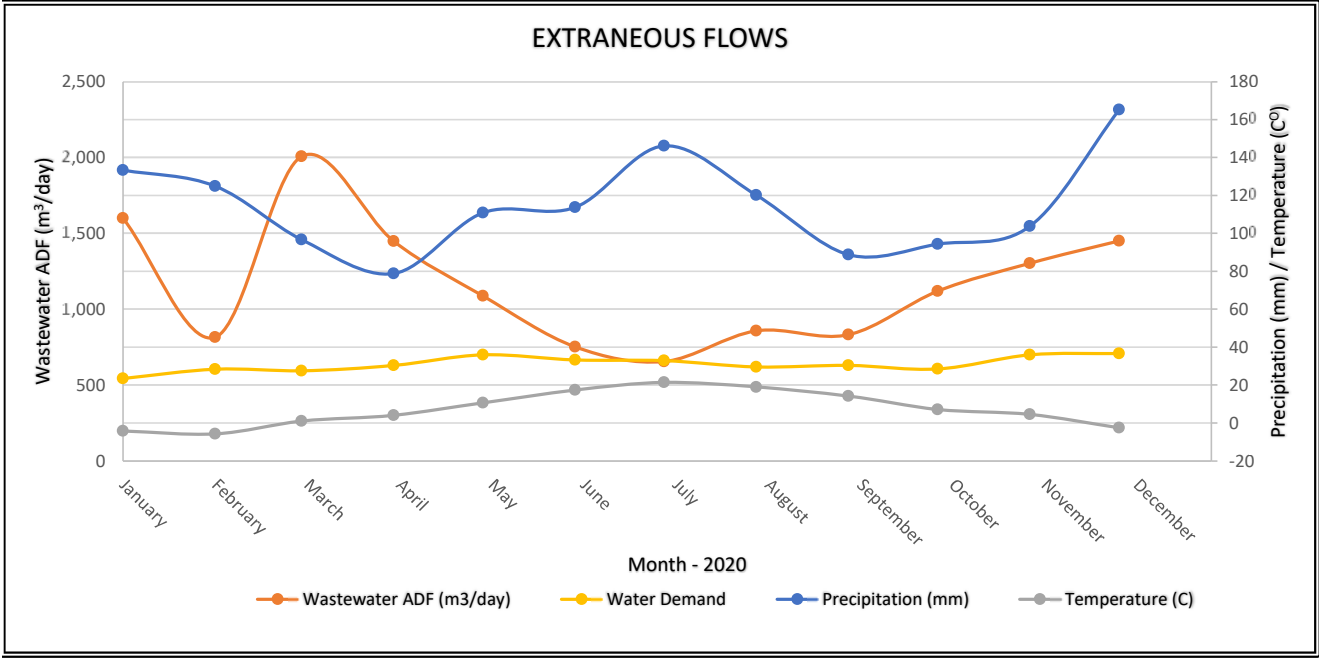
TABLE 4
TOWNSHIP OF SOUTHGATE
2021 RESERVE CAPACITY
DUNDALK EXTRANEOUS FLOWS

MONTH	PRECIPITATION (mm)	AMBIENT TEMP. (C°)	WASTEWATER ADF (m^3/day)	WATER ADD (m^3/day)	EXTRANEOUS FLOW (m^3/day)[1]
January-2020	133.4	-4.15	1,600	544	1,056
February-2020	125	-5.68	816	605	211
March-2020	96.8	1.02	2,008	595	1,413
April-2020	78.8	4.06	1,449	629	820
May-2020	110.9	10.66	1,087	700	387
June-2020	113.8	17.40	752	665	87
July-2020	146.2	21.38	656	661	0
August-2020	120.2	19.00	857	620	237
September-2020	88.8	14.26	832	630	202
October-2020	94.4	7.16	1,120	606	514
November-2020	103.8	4.54	1,304	700	604
December-2020	165.2	-2.48	1,450	708	742
AVERAGE			**1,161**	**639**	**523**
REASONABLE EXTRANEOUS FLOW BASED ON POPULATION(m^3/day)[1]					**166**
EXTRANEOUS FLOW OVER AND ABOVE REASONABLE AMOUNT(m^3/day)					**356**
EQUIVALENT RESIDENTIAL UNITS USED BY EXTRANEOUS FLOWS (ERU)[2]					**383**

[1] This is the Wastewater ADF minus the Water ADD, used to determine Sanitary Flow over and above expected.

[2] Expected infiltration is 60 Litres per person per day based on modified historic MOE Standard.

[3] Based on New Development Equivalent Residential Unit Sanitary Flow Rate



CROZIER
CONSULTING ENGINEERS

Project: Glenelg Phase 2
Project No.: 1060-5545
Date: 15-Dec-21
By: JL'A
Check: BR

Dundalk Sanitary Capacity Evaluation

DESCRIPTION	DECEMBER 2021	POST WWTP UPGRADES	UNITS
Available Capacity	1,832	3,025	m3/day
Average Day Flow	1,127	1,127	m3/day
Reserve Capacity	705	1,898	m3/day
Serviced Households	1,067	1,067	ERUs
Persons Per Existing Residential Unit (2016 Census Data)	2.6	2.6	Persons
Maximum Day Per Capita Flow	0.331	0.331	m3/day
Persons Per New Equivalent Residential Unit (2017 DC Background Study)	2.66	2.66	Persons
Average New Development Per Capita Flow	0.35	0.35	m3/day
Equivalent Flow Per Residential Unit	0.931	0.931	m3/day
Additional ERUs that can be serviced	**758**	**2039**	**ERUs**

CROZIER
CONSULTING ENGINEERS

Project: Glenelg Phase 2
Project No.: 1060-5545
Date: 15-Dec-21
By: JL'A
Check: BR

TOTAL EQUIVALENT RESIDENTIAL UNIT (ERU) SUMMARY OF OCCUPIDE, COMMITTED AND UNCOMMITTED UNITS

DEVELOPMENT	OCCUPIED UNITS 2020	COMMITTED UNITS	UNCOMMITTED UNITS
White Rose (Phase 1& 2)	52	14	0
Flato East (Phase 2B)	38	0	0
Flato North (Phase 2A)	72	0	0
Flato North (Phase 3)	8	38	0
Flato North (Phase 4)	0	22	0
Flato North (Phase 5)	0	59	0
Flato North (Phase 6)	0	68	0
Glenelg (Phase 1)	0	183	0
Flato West Block 75	0	56	0
Flato East (Phase 7, 8 & 10)	0	188	0
Infill Lots	0	3	0
TOTAL COMMITTED UNITS 2020		**631**	**0**
White Rose (Phase 3)	0	**0**	101
Flato East (Phase 9)	0	**0**	47
Flato East (Phase 11)	0	**0**	193
Glenelg (Phase 2)	0	**0**	155
Dundalk Commercial	0	**0**	24
TOTAL UNCOMMITTED UNITS			**520**
Total Number of Available ERUs Upon Completion of WWTP Upgrades			**2039**
Total Projected ERUs of Reserve Capacity Available Upon Occupation of Committed Units			**1408**
Projected ERUs of Reserve Capacity Available Upon Occupation of The Above Uncommitted Units			**888**

Appendix C

Sanitary Servicing

CROZIER CONSULTING ENGINEERS

File: 1060-6220
Date: 2022.02.02
By: JL'A
Check By: BR

Dundalk Northwest - Sanitary Design Criteria

Developed Site Area		24.80	ha
Number of Residential Units		450	
	TOTAL:	**450**	**units**
Person Per Unit		2.66	persons/unit
Residential Population		1,197	persons
Commercial/School			
Commercial/School Floor Area		0.69	ha
Commercial/School Water Design Flows		5	$L/m^2/day$
Commercial/ Retail (per OBC (2012) Table 8.2.1.3(B))			
Daily Commerical Flows		34500	L/day
Equivalent Commercial Population		**99**	**persons**
Unit Sewage flows			
Residential (Per New Development Unit Flow Rates, Triton Engineering (2019		350	L/C-day
Infiltration (typical)		0.15	L/s/ha
Total Design Sewage Flows			
Infiltration/Inflow Residential		3.72	L/sec
Average Daily Residential Flow		5.25	L/sec
Residential Peak Factor	(Harmon Formula)	3.7	
Total Peak Daily Flow		**23.27**	**L/sec**

CROZIER
CONSULTING ENGINEERS

File: 1060-6220
Date: 2022.02.02
By: JL'A
Check By: BR

Dundalk Northeast Development (Glenelg Connection) - Sanitary Design Criteria

Developed Site Area		9.47	ha
Number of Residential Units		200	units
	TOTAL:	**200**	**units**
Person Per Unit		2.66	persons/unit
Residential Population		532	persons

Unit Sewage flows

Residential (Per New Development Unit Flow Rates, Triton Engineering (2019	350	L/C-day
Infiltration (typical)	0.15	L/s/ha

Total Design Sewage Flows

Infiltration/Inflow Residential		1.42	L/sec
Average Daily Residential Flow		2.16	L/sec
Residential Peak Factor	(Harmon Formula)	4.0	
Total Peak Daily Flow		**9.96**	**L/sec**

CROZIER
CONSULTING ENGINEERS

File: 1060-6220
Date: 2022.02.02
By: JL'A
Check By: BR

Dundalk Northeast Development (Bradley Street Connection) - Sanitary Design Criteria

Developed Site Area		15.53	ha
Number of Residential Units		260	units
	TOTAL:	**260**	**units**
Person Per Unit		2.66	persons/unit
Residential Population		692	persons

Unit Sewage flows

Residential (Per New Development Unit Flow Rates, Triton Engineering (2019	350	L/C-day
Infiltration (typical)	0.15	L/s/ha

Total Design Sewage Flows

Infiltration/Inflow Residential	2.33	L/sec
Average Daily Residential Flow	2.80	L/sec
Residential Peak Factor (Harmon Formula)	3.9	
Total Peak Daily Flow	**13.25**	**L/sec**

CROZIER
CONSULTING ENGINEERS

File: 1060-6220
Date: 2022.02.02
By: JL'A
Check By: BR

Dundalk Northeast Development (Sanitary Pumping Station) - Sanitary Design Criteria

Developed Site Area		85.00	ha
Number of Residential Units		1,190	units
	TOTAL:	**1,190**	**units**
Person Per Unit		2.66	persons/unit
Residential Population		3,165	persons
Commercial/School			
Commercial/School Floor Area		1.91	ha
Commercial/School Water Design Flows		5	$L/m^2/day$
Commercial/ Retail (per OBC (2012) Table 8.2.1.3(B))			
Daily Commerical Flows		95500	L/day
Equivalent Commercial Population		**273**	**persons**

Unit Sewage flows

Residential (Per New Development Unit Flow Rates, Triton Engineering (2019		350	L/C-day
Infiltration (typical)		0.15	L/s/ha

Total Design Sewage Flows

Infiltration/Inflow Residential		12.75	L/sec
Average Daily Flow		13.93	L/sec
Residential Peak Factor	(Harmon Formula)	3.4	
Total Peak Daily Flow		**59.99**	**L/sec**

CROZIER CONSULTING ENGINEERS

File: 1060-5545
Date: 2022.02.02
By: JL'A
Check By: BR

Dundalk Southeast Development - Sanitary Design Criteria

Developed Site Area		56.78	ha
Residential			
Number of Residential Units		400	units
	TOTAL:	400	units
Person Per Unit		2.66	persons/unit
Residential Population		**1,064**	**persons**
Commercial/School			
Commercial/School Floor Area		4.53	ha
Commercial Water Design Flows		5	$L/m^2/day$
Commercial/ Retail (per OBC (2012) Table 8.2.1.3(B))			
Daily Commerical Flows		226,500	L/day
Equivalent Commercial Population		**647**	**persons**
Industrial			
Industrial Floor Area		11.18	ha
Industrial Water Design Flows		3.5	$L/m^2/day$
Industrial/Factory (per OBC (2012) Table 8.2.1.3(B))			
Daily Industrial Flows		391,125	L/day
Equivalent Industrial Population		**1,118**	**persons**
TOTAL POPULATION		**2,829**	**persons**

Unit Sewage flows

Residential (Per New Development Unit Flow Rates, Triton Engineering (2019))	350	L/C-day
Infiltration (typical)	0.15	L/s/ha

Total Design Sewage Flows

Infiltration/Inflow Residential	8.52	L/sec
Average Daily Residential Flow	11.46	L/sec
Residential Peak Factor (Harmon Formula)	3.8	
Total Peak Daily Flow	**51.86**	**L/sec**

Appendix D

Water Servicing

CROZIER
CONSULTING ENGINEERS

File: 1060-6220
Date: 2022.02.02
By: JL'A
Check By: BR

Dundalk Northwest - Domestic Water Design Criteria

Developed Site Area	24.80	ha
Number of Residential Units- Low Density	409	units
Number of Residential Units- Medium Density	40	units
Total Number of Units	449	units
Persons Per Unit	2.66	persons/unit
Residential Population	1,194	persons
Commercial/School		
Commercial/School Floor Area	0.69	ha
Commercial/School Water Design Flows	5	$L/m^2/day$
Commercial/ Retail (per OBC (2012) Table 8.2.1.3(B))		
Daily Commerical Flows	34500	L/day
Equivalent Commercial Population	**99**	**persons**
Domestic Water Design Flows		
Residential [Per New Development Unit Flow Rates, Triton Engineering (2021)]	331	L/C-day
Total Domestic Water Design Flows		
Average Residential Daily Flow	4.95	L/sec
Max Day Peak Factor	2.75	
Max Day Demand Flow	**13.62**	L/sec
Peak Hour Factor	4.13	
Peak Hour Flow	**20.46**	L/sec

CROZIER
CONSULTING ENGINEERS

File: 1060-6220
Date: 2022.02.02
By: JL'A
Check By: BR

Dundalk Northeast Development - Domestic Water Design Criteria

Developed Site Area	110.00	ha
Total Number of Units	1650	units
Persons Per Unit	2.66	persons/unit
Residential Population	4,389	persons
Commercial/School		
Commercial/School Floor Area	1.91	ha
Commercial/School Water Design Flows	5	$L/m^2/day$
Commercial/ Retail (per OBC (2012) Table 8.2.1.3(B))		
Daily Commerical Flows	95500	L/day
Equivalent Commercial Population	**273**	**persons**
Domestic Water Design Flows		
Residential [Per New Development Unit Flow Rates, Triton Engineering (2021)]	331	L/C-day
Total Domestic Water Design Flows		
Average Residential Daily Flow	17.86	L/sec
Max Day Peak Factor	2.75	
Max Day Demand Flow	**49.11**	L/sec
Peak Hour Factor	4.13	
Peak Hour Flow	**73.76**	L/sec

CROZIER CONSULTING ENGINEERS

File: 1060-5590
Date: 2022.02.02
By: JL'A
Check By: BR

Dundalk Southeast Development - Domestic Water Design Criteria

Developed Site Area		56.78	ha
Residential			
Number of Residential Units		400	units
	TOTAL:	400	units
Persons Per Unit		2.66	persons/unit
Residential Population		**1,064**	**persons**
Commercial/School			
Commercial/School Floor Area		4.53	ha
Commercial/School Water Design Flows		5	$L/m^2/day$
Commercial/ Retail (per OBC (2012) Table 8.2.1.3(B))			
Daily Commerical Flows		226500	L/day
Equivalent Commercial Population		**647**	**persons**
Industrial			
Industrial Floor Area		11.175	ha
Industrial Water Design Flows		3.5	$L/m^2/day$
Industrial/Factory (per OBC (2012) Table 8.2.1.3(B))			
Daily Industrial Flows		391125	L/day
Equivalent Industrial Population		**1,118**	**persons**
TOTAL POPULATION		**2,829**	**persons**
Domestic Water Design Flows			
Residential [Per New Development Unit Flow Rates, Triton Engineering (2021)]		331	L/C-day
Total Domestic Water Design Flows			
Average Residential Daily Flow		10.84	L/sec
Max Day Peak Factor		2.75	
Max Day Demand Flow		**29.80**	L/sec
Peak Hour Factor		4.13	
Peak Hour Flow		**44.76**	L/sec

Figures

FIGURE 1

Sites Subject to proposed MZO

Dundalk Northeast
Dundalk Northwest
Dundalk Southeast

Concession 1, 2, & 3, SWTSR
Township of Southgate

LEGEND

- Settlement Boundary
- Site Boundary

DATE Feb. 1, 2022

SOURCES
ESRI
County of Grey

0 95 190 380 570 760 950
Meters

15184AC - Figures

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

FLATO IN SOUTHGATE

Conceptual Vision for a Thriving Community in West Dundalk

Township of Southgate

GLENELG ST

DUNDALK

COUNTY RD 9

MAIN ST

IDA ST

LEGEND

- Subject Lands (33ha)
- Dundalk Settlement Boundary
- Future Road Connection
- Residential Neighbourhood
- Rental Apartment
- School
- Park
- Environmental Area
- Stormwater Management Area

DATE: January 26, 2022

SCALE: 0 40 80 120 160 200 Metres

FLATO® DEVELOPMENTS INC.

FLATO IN SOUTHGATE

Conceptual Vision for a Thriving Community in Northeast Dundalk

Township of Southgate

HIGHWAY 10

GREY COUNTY RAIL TRAIL

GLENELG ST

GREY ST

BRADLEY ST

DUNDALK ST

DUNDALK

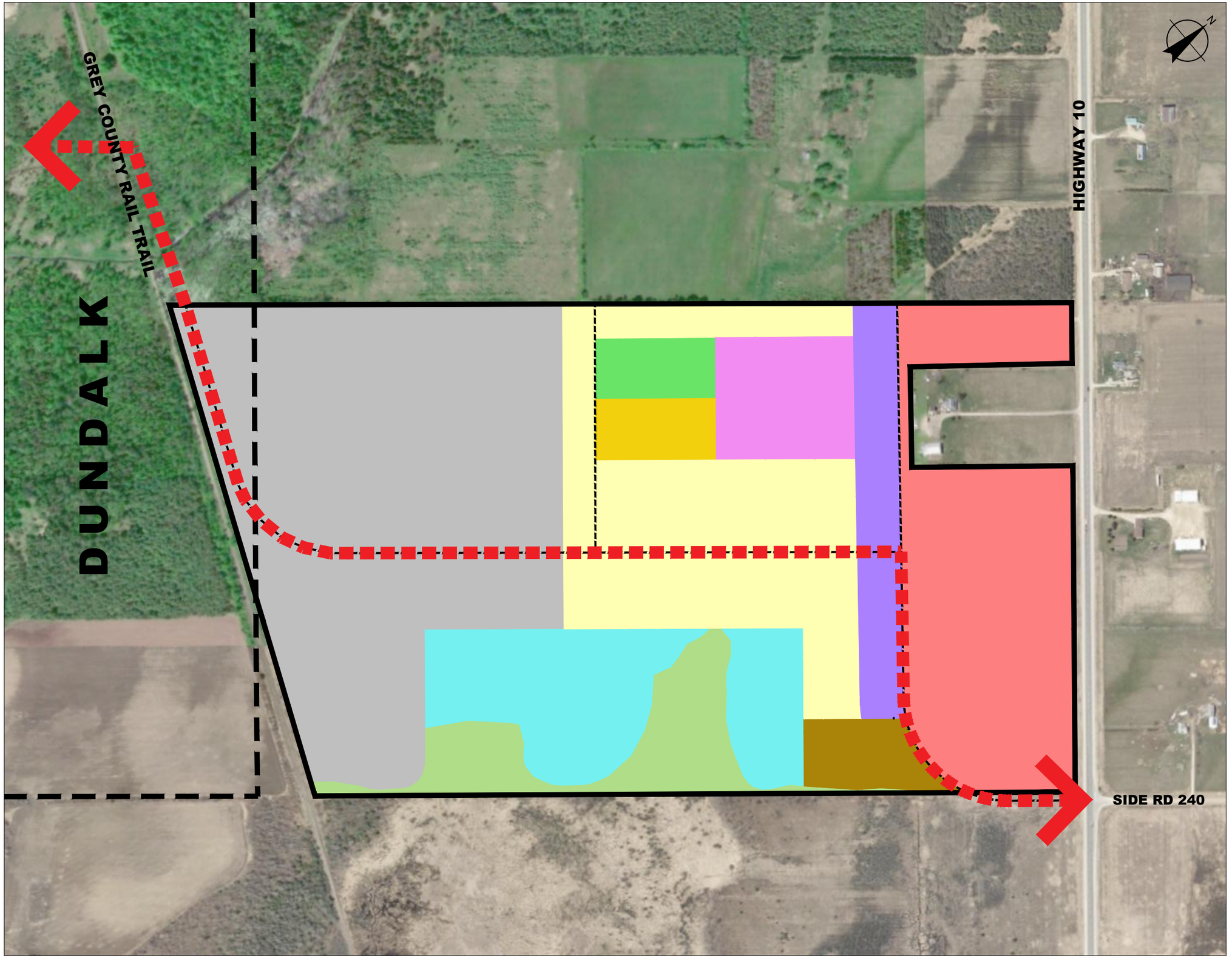
LEGEND

- Subject Lands (132ha)
- Dundalk Settlement Boundary
- Highway 10 Connection
- Future Road Connection
- Residential Neighbourhood
- Rental Apartment
- School
- Park
- Environmental Area
- Stormwater Management Area

DATE: February 1, 2022

SCALE: 0 50 100 150 200 250 Metres

FLATO® DEVELOPMENTS INC.



FLATO IN SOUTHGATE

Conceptual Vision for a Thriving Community in Southeast Dundalk

Township of Southgate

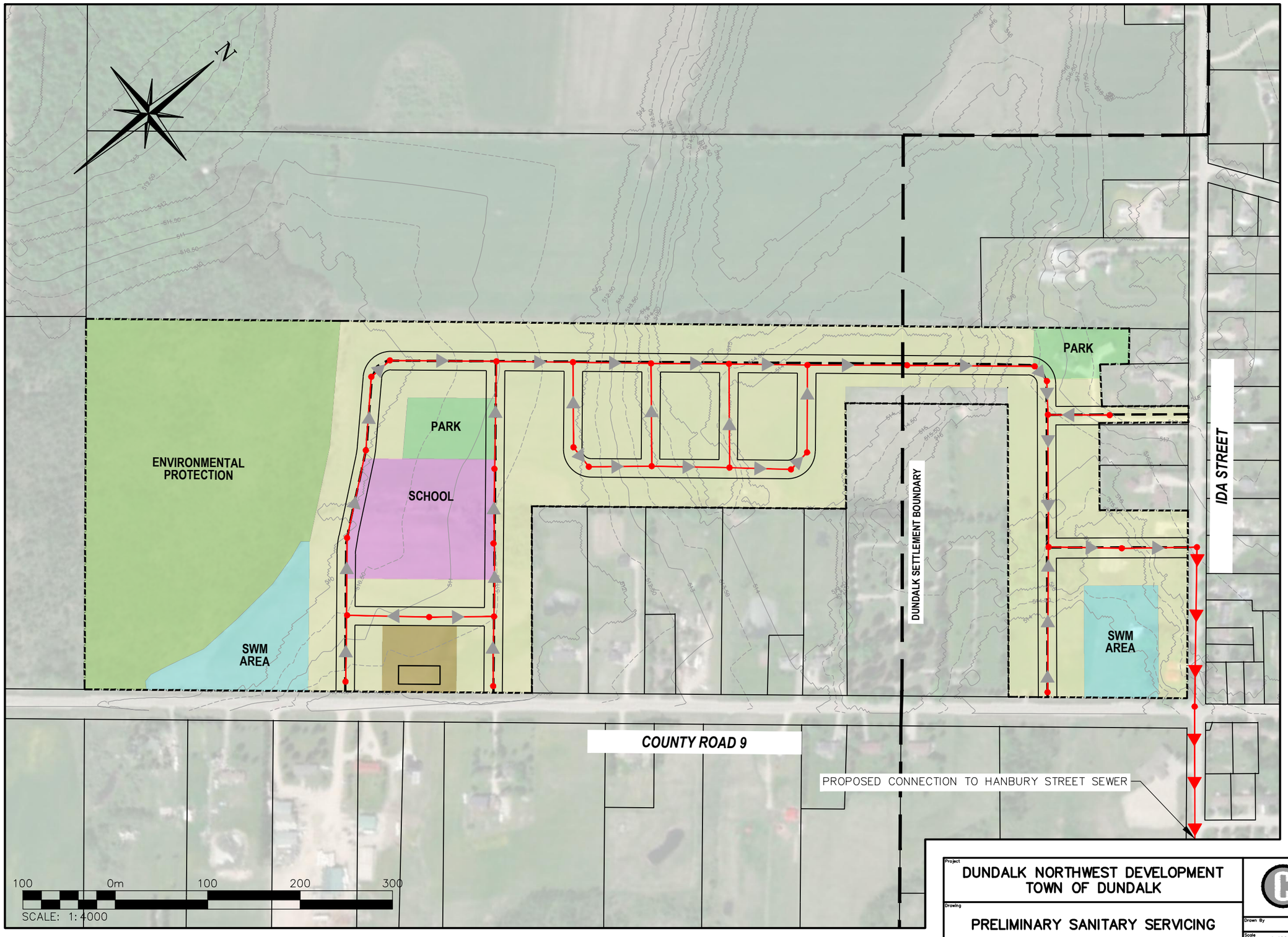
LEGEND

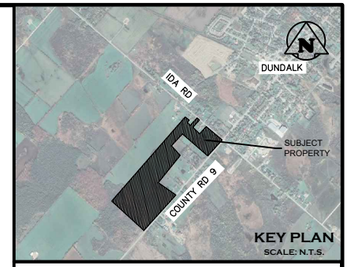
- Subject Lands (60ha)
- Dundalk Settlement Boundary
- Highway 10 Connection
- Future Road Connection
- Residential Neighbourhood
- Affordable Housing
- Rental Apartment
- Livework Housing
- School
- Commercial
- Industrial
- Park
- Environmental Area
- Stormwater Management Area

DATE: January 26, 2022

SCALE: 0 40 80 120 160 200 Metres

FLATO® DEVELOPMENTS INC.





LEGEND

- FUTURE ROAD CONNECTION
- PROPERTY BOUNDARY
- PR. SANITARY SERVICE
- PR. EXTERNAL SANITARY SERVICE
- RESIDENTIAL NEIGHBORHOOD
- RENTAL APARTMENT
- PARK
- SWM FACILITY
- SCHOOL
- ENVIRONMENTAL AREA

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DUNDALK NORTHWEST DEVELOPMENT
TOWN OF DUNDALK

Drawing
PRELIMINARY SANITARY SERVICING

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
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Scale	Date	Check By	Drawing
1: 4000	FEB/01/2022	J.L.A.	FIG 3A

100 0m 100 200 300 400

SCALE: 1:6000

N

HIGHWAY 10

ENVIRONMENTAL AREA

ENVIRONMENTAL AREA

SANITARY CONNECT TO FUTURE FORCEMAIN

PARK

SWM FACILITY

SCHOOL

PARK

ENVIRONMENTAL AREA

SWM FACILITY

SANITARY CONNECTION TO FUTURE SEWER

SANITARY CONNECT TO FUTURE SEWER

ENVIRONMENTAL AREA

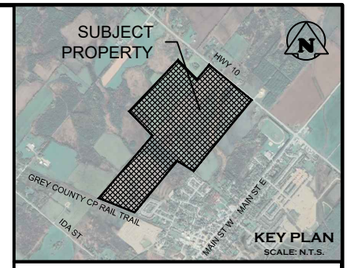
COUNTY RAIL TRAIL

LENELG ST

GREY ST

BRADLEY ST

DUNDALK



LEGEND

- SUBJECT LANDS
- PR. SANITARY SERVICING
- EX. EXTERNAL SAN. SERVICING
- FUT. EXTERNAL SAN. SERVICING
- FUTURE FORCEMAIN
- RESIDENTIAL NEIGHBORHOOD
- RENTAL APARTMENTS
- PARK
- SWM FACILITY
- ENVIRONMENTAL AREA
- SCHOOL BLOCK

Project: DUNDALK NORTHWEST DEVELOPMENT
TOWN OF DUNDALK

Drawing: PRELIMINARY SANITARY SERVICING

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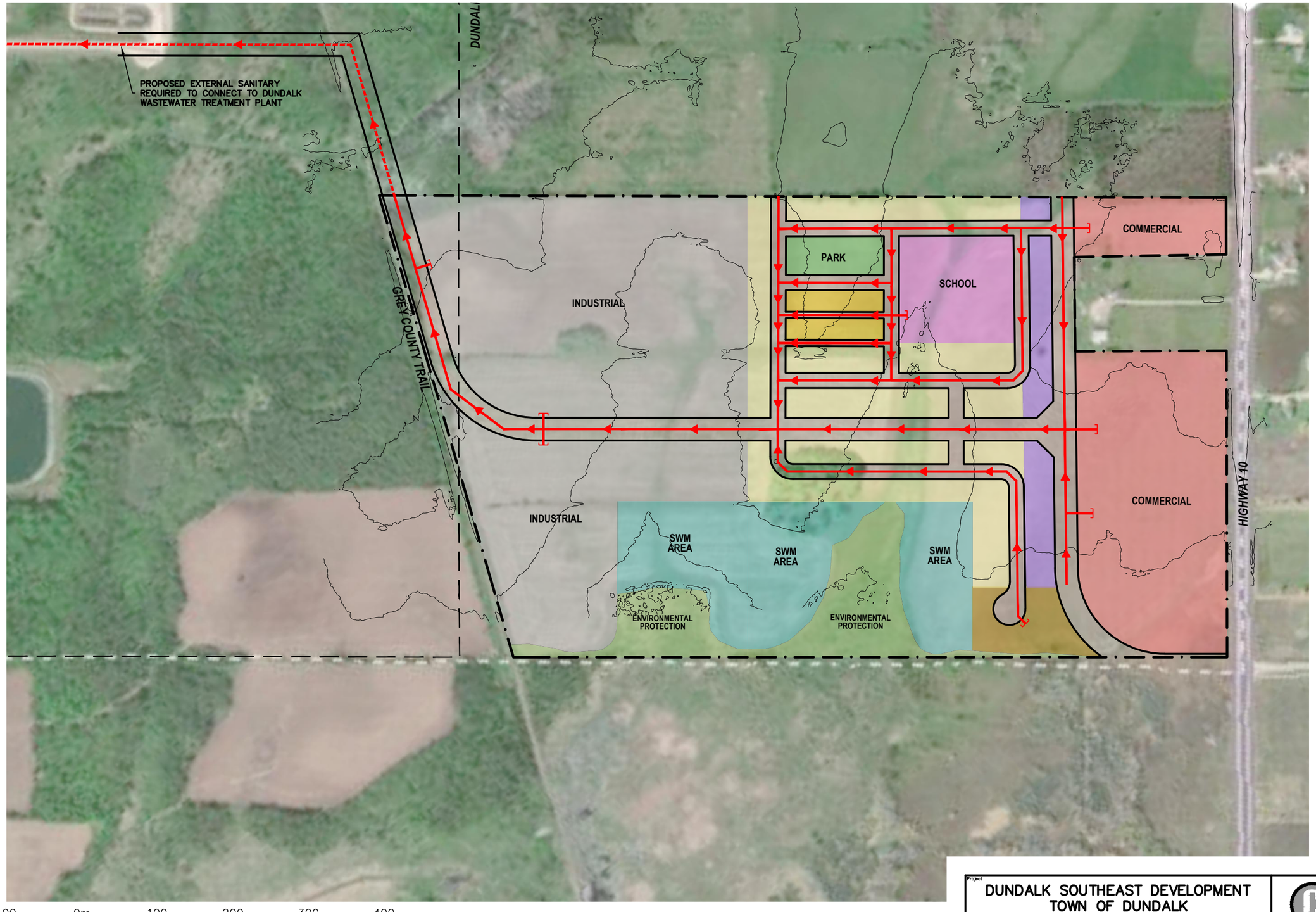
M.T.	M.T.	1060-6220
Scale	Date	Check By	Drawing
1:6000	FEB/01/2022	J.L.A.	FIG 3B



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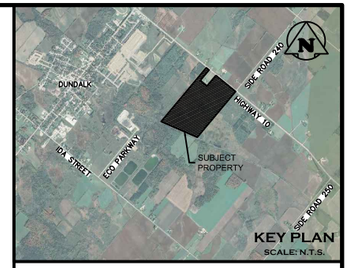
SCALE: 1:5000



N

LEGEND

- PR. SANITARY SERVICING
- PR. EXTERNAL SANITARY SERVICING
- PROPERTY BOUNDARY
- SINGLES
- AFFORDABLE
- LIVEWORK TOWNS
- APARTMENT
- COMMERCIAL
- INDUSTRIAL
- PARK
- SWM FACILITY
- OPEN SPACE
- SCHOOL

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TOWN OF DUNDALK

Drawing: PRELIMINARY SANITARY SERVICING

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ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
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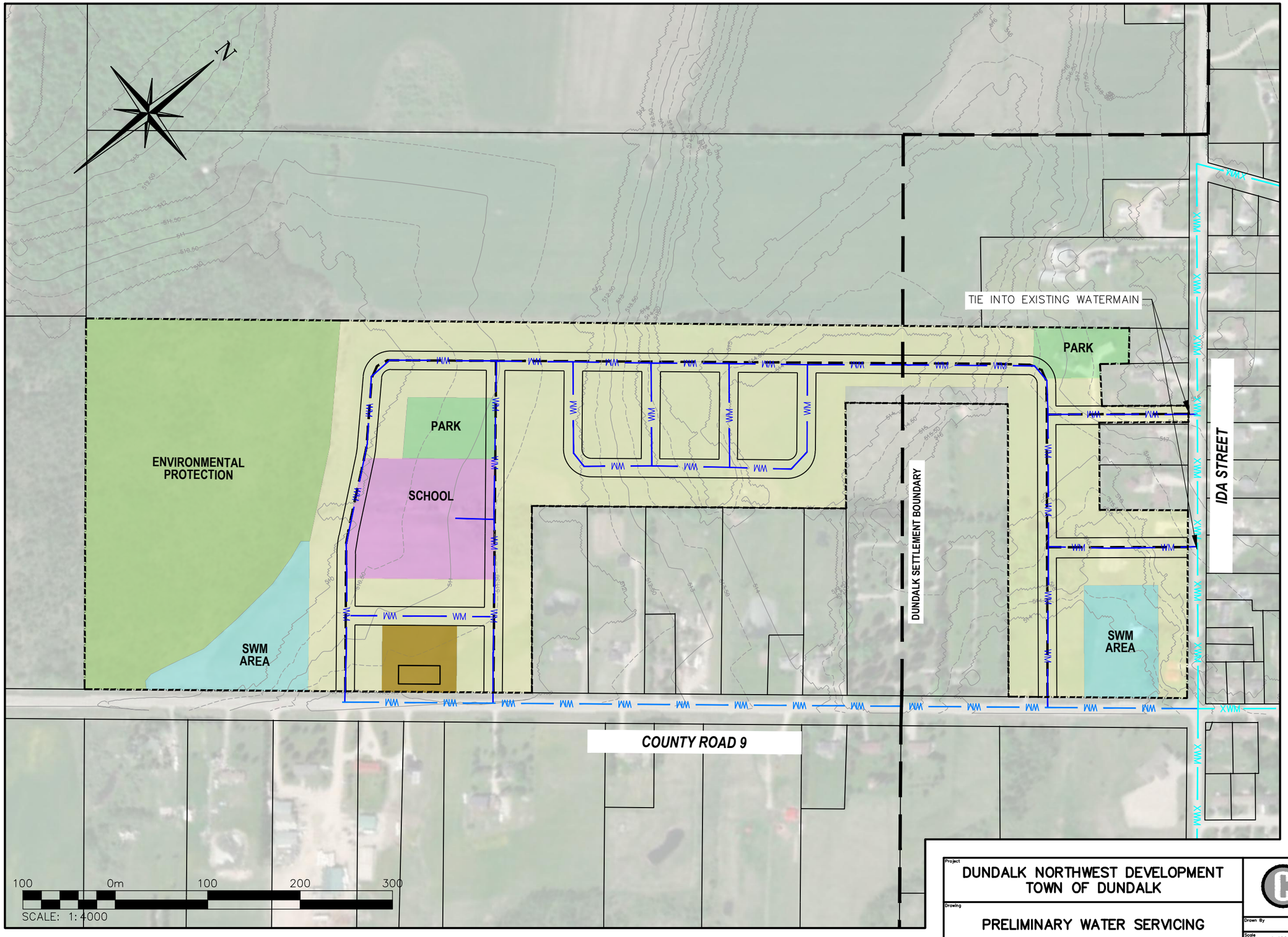
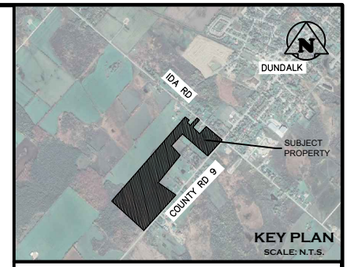
J.P.	J.P.	1060-4513
Scale	Date	Check By	Drawing
1:5000	JAN/14/2022	J.L.A	FIG 3C





LEGEND

- FUTURE ROAD CONNECTION
- PROPERTY BOUNDARY
- PROPOSED WATER SERVICE
- PROPOSED EXTERNAL WATER SERVICE
- EXISTING WATER SERVICE
- RESIDENTIAL NEIGHBORHOOD
- RENTAL APARTMENT
- PARK
- SWM FACILITY
- SCHOOL
- ENVIRONMENTAL AREA

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TOWN OF DUNDALK

Drawing
PRELIMINARY WATER SERVICING

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ADMIRAL BUILDING
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R.D.M.	J.L.A.	1060-5590
Scale	Date	Check By	Drawing
1: 4000	FEB/01/2022	J.L.A.	FIG 4A

100 0m 100 200 300 400

SCALE: 1:6000

N

HIGHWAY 10

ENVIRONMENTAL AREA

ENVIRONMENTAL AREA

WM

PARK

SWM FACILITY

SCHOOL

PARK

ENVIRONMENTAL AREA

SWM FACILITY

ENVIRONMENTAL AREA

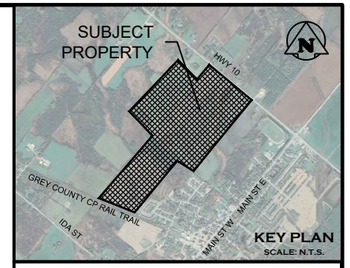
WATERMAIN CONNECTION TO FUTURE MAIN

GREY COUNTY RAIL TRAIL

GREY ST

BRADLEY ST

DUNDALK



LEGEND

- SUBJECT LANDS
- WM — PR. WATERMAIN
- WM — EX. EXTERNAL WATERMAIN
- WM — FUT. EXTERNAL WATERMAIN
- RESIDENTIAL NEIGHBORHOOD
- RENTAL APARTMENTS
- PARK
- SWM FACILITY
- ENVIRONMENTAL AREA
- SCHOOL BLOCK

Project: DUNDALK NORTH DEVELOPMENT
TOWN OF DUNDALK

Drawing: PRELIMINARY WATER SERVICING

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ADMIRAL BUILDING
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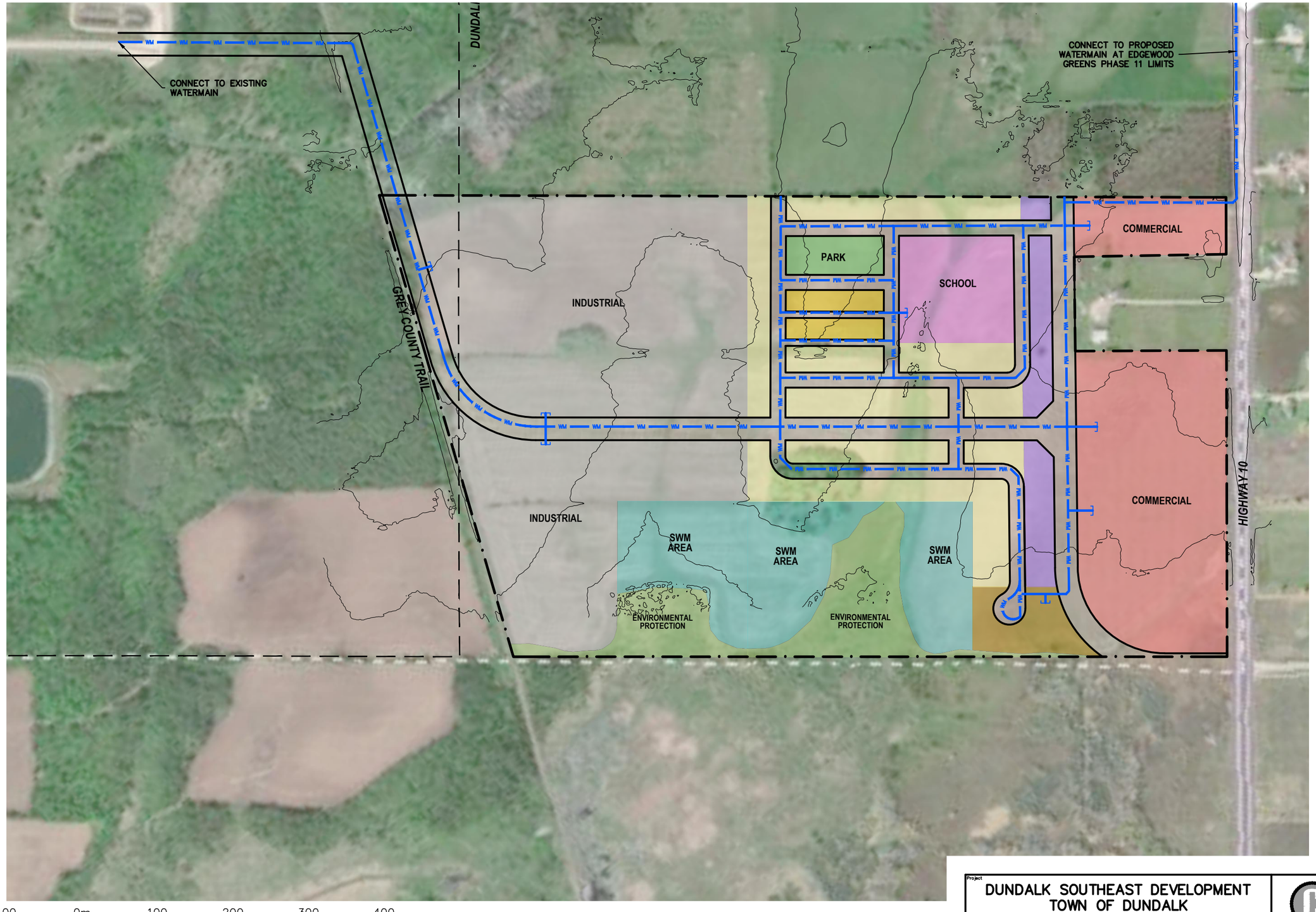
Drawn By	Design By	Project
M.T.	M.T.	1060-6220
Scale	Date	Check By	Drawing
1:6000	FEB/01/2022	J.L.A.	FIG 4B



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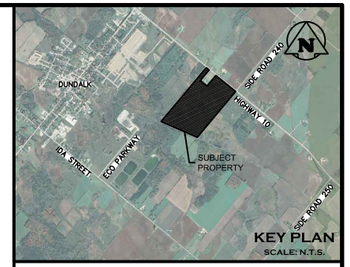

N

LEGEND

- PR. WATERMAIN
- PROPERTY BOUNDARY
- SINGLES
- AFFORDABLE
- LIVEWORK TOWNS
- APARTMENT
- COMMERCIAL
- INDUSTRIAL
- PARK
- SWM FACILITY
- OPEN SPACE
- SCHOOL

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TOWN OF DUNDALK

Drawing: PRELIMINARY WATER SERVICING

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
COLLINGWOOD, ON, L9Y 1A1
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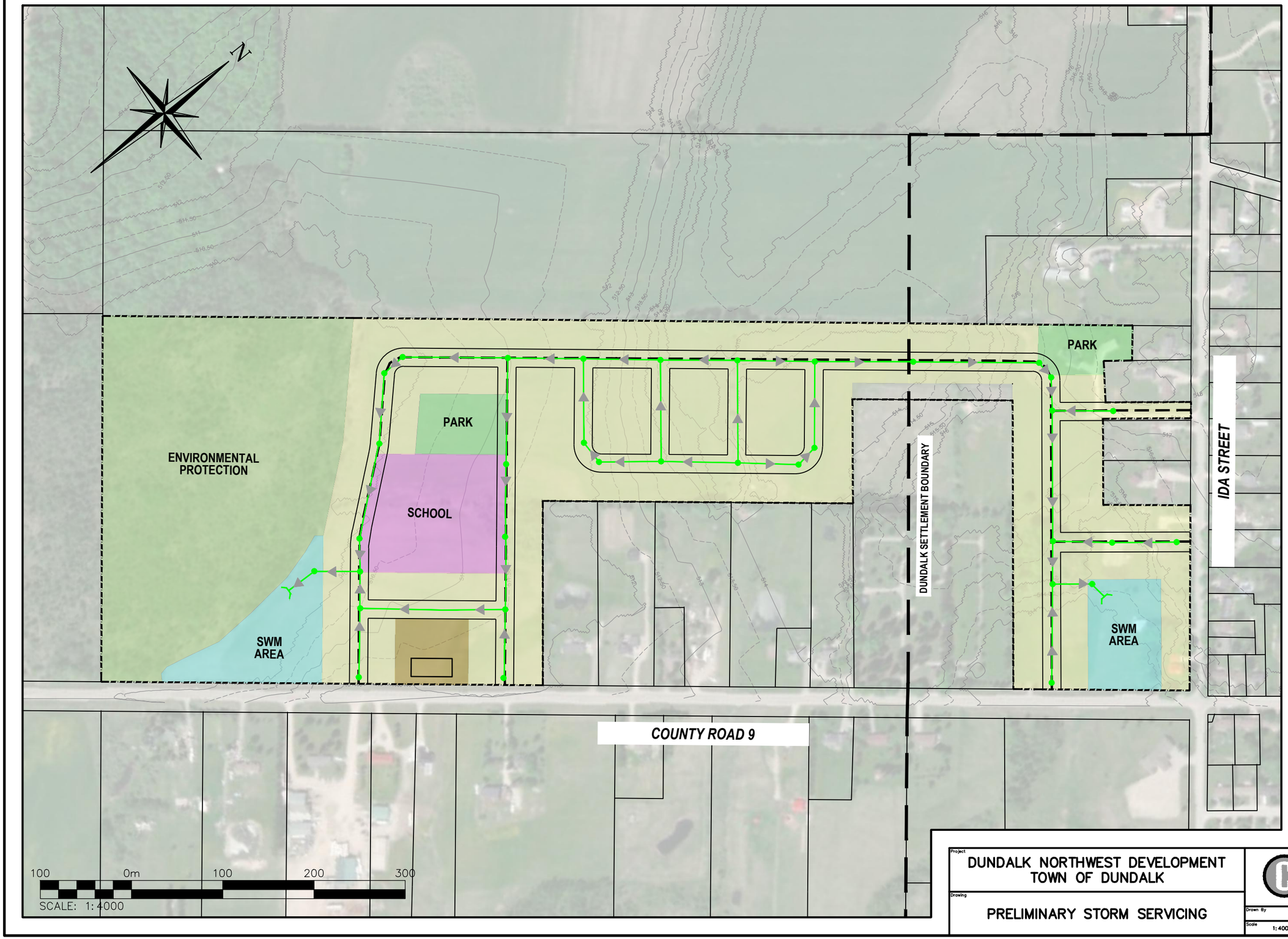
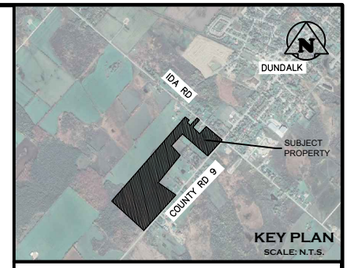
Drawn By	Design By	Project
J.P.	J.P.	1060-4513
Scale	Date	Check By	Drawing
1:5000	JAN/14/2022	J.L.A	FIG 4C





LEGEND

- FUTURE ROAD CONNECTION
- PROPERTY BOUNDARY
- PR. STORM SERVICE
- RESIDENTIAL AREA
- RENTAL APARTMENT
- PARK
- SWM FACILITY
- SCHOOL
- ENVIRONMENTAL AREA

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DUNDALK NORTHWEST DEVELOPMENT
TOWN OF DUNDALK

Drawing
PRELIMINARY STORM SERVICING

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R.D.M.	J.L.A.	1060-5590
Scale	Date	Check By	Drawing
1:4000	FEB/01/2022	J.L.A.	FIG 5A

100 0m 100 200 300 400

SCALE: 1:6000

N

HIGHWAY 10

ENVIRONMENTAL AREA

ENVIRONMENTAL AREA

SWM OUTLET #1 (TO SVCA)

SWM OUTLET #2 (TO SVCA)

SWM FACILITY INLET

SWM FACILITY

SWM OUTLET #3 (TO GRCA)

PARK

SCHOOL

SWM FACILITY INLET

ENVIRONMENTAL AREA

SWM FACILITY

PARK

SWM OUTLET #4 (TO GRCA)

ENVIRONMENTAL AREA

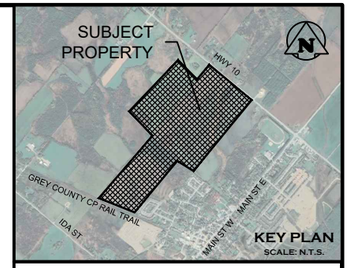
GREY COUNTY RAIL TRAIL

GLENELG ST

GREY ST

BRADLEY ST

DUNDALK



LEGEND

- SUBJECT LANDS
- PR. STORM SERVICING
- RESIDENTIAL NEIGHBORHOOD
- RENTAL APARTMENTS
- PARK
- SWM FACILITY
- ENVIRONMENTAL AREA
- SCHOOL BLOCK

Project: DUNDALK NORTH DEVELOPMENT
TOWN OF DUNDALK

Drawing: PRELIMINARY STORMWATER SERVICING

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
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Drawn By	Design By	Project
M.T.	M.T.	1060-6220
Scale: 1:6000	Date: FEB/01/2022	Check By: J.L.A.
		Drawing: FIG 5B

RURAL CROSS SECTION

DUNDALK

DITCH INLETS

GREY COUNTY TRAIL

INDUSTRIAL

PARK

SCHOOL

COMMERCIAL

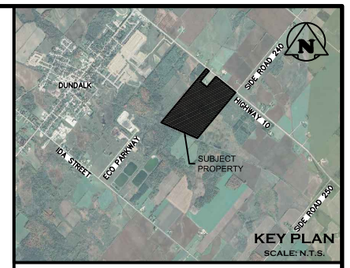
SWM FACILITY INLET

SWM AREA

ENVIRONMENTAL PROTECTION

SWM FACILITY OUTLETS

HIGHWAY 10



N

LEGEND

- PR. STORM SERVICING
- PROPERTY BOUNDARY
- SINGLES
- AFFORDABLE
- LIVEWORK TOWNS
- APARTMENT
- COMMERCIAL
- INDUSTRIAL
- PARK
- SWM FACILITY
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100 0m 100 200 300 400

SCALE: 1:5000

Project
DUNDALK SOUTHEAST DEVELOPMENT
TOWN OF DUNDALK

Drawing
PRELIMINARY STORM SERVICING

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
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Drawn By	Design By	Project
J.P.	J.P.	1060-4513
Scale	Date	Check By	Drawing
1:5000	JAN/14/2022	J.L.A	FIG 5C