Preliminary Environmental Impact Statement for Phase 2 development of Minto's Mahogany Community

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1.0 INTRODUCTION

This report is a Preliminary Environmental Impact Statement (EIS) prepared by Kilgour & Associates Ltd. (KAL) on behalf of Minto Homes Ltd. (Minto) in support of their proposed Phase 2 development of the Mahogany Community located north of East Century Road in Manotick, Ontario (the site). The proposed development has the potential to impact species-at-risk (SAR) and SAR habitat, and natural heritage features on and adjacent to the site.

The Manotick Drumlin Forest (Drumlin Forest) on the west side of the site is a candidate Area of Natural and Scientific Interest (ANSI) and potential significant woodland. Previous studies of this features have been completed by KAL and Savanta Inc. (2014), Ecotec (2007), and Brunton (1997). This feature will be further discussed in this report in the appropriate section, but is not predicated to be further surveyed due to the amount of information already available.

There are multiple potential triggers for this EIS, including: 1) the presence of potential habitat for SAR, including Butternut (*Juglans cinerea*), Bobolink (*Dolichonyx oryzivorus*), and Eastern Meadowlark (*Sturnella magna*); 2) the presence of significant woodlands and candidate ANSI on site; and 3) the potential for fish and fish habitat within the unnamed drains crossing the site. This preliminary EIS identifies which natural heritage elements may be present on site and/or impacted by the proposed development, and indicates general mitigative measures and approaches to be implemented. The major focus of the report however, is to clearly identify how those features will be assessed in greater detail during the 2017 ecological field season. This report details the 2017 program season to be implemented for terrestrial and aquatic field surveys in support of an EIS and a Headwaters Drainage Feature Assessment (HDFA) so that the City and other agencies may concur with, or provide comment on, the proposed approach.

2.0 PROPERTY INFORMATION

The subject property, located at 5651 Frist Line Road (North Gower; Lot 4 and 5, Concession A; PINs: 039020900, 039021066, 039021070, 039021073), is a 133 ha parcel owned by Minto, in the south end of Ottawa (**Error! Reference source not found.**). The property is zoned as Developmental Reserve Zone (DR1).

The purpose of this zone is to recognize lands intended for future urban development areas, limit the range of permitted uses to those which will not preclude future development options, and impose regulations which ensure a low scale and intensity of development to reflect the characteristics of existing land use (Ottawa, 2017a).

The site is primarily composed of agricultural lands, and contains the Drumlin Forest on the western edge of the property, which is designated as a potential natural heritage feature under Schedule 'L' of the City of Ottawa Official Plan (Ottawa, 2015).

The site also contains municipal drains that feed into the Rideau River via Mud Creek, and Mahogany Creek, which flows along the east boundary of the site. The agricultural and woodlands on site may provide potential habitat for SAR, and the drains on site may contain fish and fish habitat.

The property was historically used for agricultural activities as indicted in geoOttawa (Ottawa, 2017b) air photo photography from 1976, and still is used for this purpose. The woodlands on site are remnants of large forests that were visible in these 1976 air photos.

3.0 SITE AND THE NATURAL ENVIRONMENT

3.1 Methodology and Area of Detailed Assessment

Colour digital aerial photographs from geoOttawa (Ottawa, 2017b) and Google Earth were used to initially identify natural environment features on the broader site through a desktop review. Ontario Base Map (OBM), geoOttawa, and Ottawa OP Schedule L layers (Ottawa, 2015) were used to demarcate surface water, potential wetland areas, and other natural heritage system features and were overlaid on the aerial photographs to aid interpretation.

Additional information on natural heritage features and wildlife species for the site was obtained from online sources, which include but are not limited to:

- Natural Heritage Information Centre (MNRF, 2017a);
- Rideau Valley Conservation Authority (RVCA, 2017);
- Species at Risk Public Registry (Canada, 2017);
- Ontario Species at Risk List (MNRF, 2017b);
- Breeding Bird Atlas of Ontario (OBBA) (Cadman *et al*., 2007);
- Bat Conservation International species profiles (BCI, 2017); and,
- Reptiles and Amphibians of Ontario (Ontario Nature, 2017).

3.2 Landform, Soils and Geology

The study area is underlain by Paleozoic dolostone and sandstone of the Beekmantown Group (OGS, 2013a; 2013b).

On a more local scale, the property occurs with the North Gower association, which is neutral to alkaline silty clay loam or clay loam marine material, over silty clay or clay marine materials at a depth greater than 1 m. This area is also combined with the Dalhousie association which is gray neutral silty clay or clay marine materials (Schut and Wilson, 1987).

Additional soil series are found in the area, and includes the Grenville series and eroded banks along the drains. The Grenville association is composed of alkaline stony sandy loam, fine sandy loam, loam, or silt loam glacial till material.

The previous reports of the adjacent Drumlin Forest included analysis of the geology and soils of this feature (KAL, 2014). The following is an excerpt from that report:

> "*The Study Area is part of the North Gower Drumlin Field, a feature that extends south towards Kemptville. There are three till drumlins within the study area. The largest, and the dominant geological feature of the site, runs through the western portion of the southern woodlot. This is the drumlin for which the Manotick Drumlin ANSI was named, and which is a dominant feature of the mature Sugar Maple forest. Additional portions of smaller drumlins are present in the northwestern portion of the Mahogany woodlot, and in a small area along Century Road. These deposits sit on top of the Paleozoic bedrock, and are made up of glacial till deposited during the retreat of the most recent glaciation (ca. 9000 years ago). The till is described as sandy silt with few stones. The soils on this portion of the site remain sandy and well-drained, and strongly influence the vegetation communities in the Manotick Woods."*

The Phase 2 area is mostly flat with a few small low lying areas throughout, such as the forest to the west. Some of these areas are likely to be inundated with water, with potential to form ephemeral wetlands in the spring and early summer. The property also slopes near the Wilson-Cowan drain features to allow unobstructed sheet flow runoff from the cultivated fields. The soil was originally ranked as very stony, but this has likely been altered on site due to the agricultural activities.

There are no rocky outcrops on the site and no Earth Science Areas or Natural and Scientific Interest as designated by the Ministry of Natural Resources identified in OP Schedule K (Ottawa, 2015).

3.3 Surface Water, Groundwater and Fish Habitat

The site and adjacent lands lie within the Mud Creek and Rideau River – Long Island Catchment (RRLIC) Subwatersheds (SWS) (RVCA, 2012a; 2012b). The Rideau River is located approximately 190 m to the northeast and Mud Creek isf approximately 750 m to the west of the site. The Wilson-Cowan Drain flows northward on the west side of the Drumlin Forest and touches the northwestern most edge of the Phase 2 Area. The Wilson-Cowan Drain Tributary flows along the eastern edge of the Drumlin Forest and is located within the western half of Phase 2. Mahogany Creek borders the site on the east and feeds into the Rideau River to the north. Habitat improvements have been planned and are underway for this feature as part of the development of the adjacent Phase 1 area. The Mud Creek Catchment SWS provides fish habitat to 28 fish species (RVCA, 2012a) and the RRLIC SWS provides fish habitat to 39 species (RVCA, 2012b). The smaller drainage features on site are unlikely to provide habitat for most of these species.

Several smaller aquatic channels are, or appear to be, present on and around the site. These include small agricultural drains within several of the hedgerows, roadside ditches along Century Road, and one or more swales located within existing farm fields. All of these minor features are likely to convey flows during the spring freshet, though are likely to be dry for most of the year. Further site review will be required to confirm the hydrological status.

Surveys of aquatic habitat on the site have recently been conducted only for Mahogany Creek. The Wilson-Cowan Drain features are connected to Mud Creek approximately 1.6 km north of the site, which then feeds into the Rideau River to the northeast. Any alterations to these surface water features, or to other minor features, such as farm ditches or swales conveying water to those drains/creeks (for which detailed

mapping and descriptions are yet to be completed), will require a permit from the RVCA, and alteration to fish habitat may require approval from the Department of Fisheries and Oceans Canada (DFO). We propose conducting HDFA surveys for the drains and other minor drainage features on site to determine their habitat characteristics and the presence of any fish species, and to estimate their overall functional contribution to the ecology of the catchment.

3.4 Site Vegetation

The primary land uses within the Mud Creek Catchment SWS are agricultural (63%) and woodlands (19%) (RVCA, 2012a). The remaining composition of the land use in this catchment is settlements, transportation, wetlands, and aggregate sites at 10%, 5%, 2%, and 1%; respectively. Primary land uses within the RRLIC SWS are agricultural (44%) and woodland (22%) (RVCA, 2012b). The remaining composition of the land use in this catchment is settlements, transportation, wetlands, water, and grassland at 19%, 5%, 5%, 3%, and 2%; respectively.

The Drumlin Forest on the western edge of the site was previously well surveyed and characterized by KAL (2014). This work included a detailed ecological land classification (ELC) of the feature and full assessment of all Butternuts therein. An initial tree inventory and vegetation community survey was completed for the remainder of the site on February 22, 2017. The tree inventory survey entailed the identification of tree species along with diameter at breast height (DBH) and notes on apparent health. Simultaneous with this survey, notes on vegetation communities and ecological landscape categorization of habitats on site were recorded. Results of the tree inventory surveys to date are presented in Table 1 and Figure 2.

Apart from the Drumlin Forest, the remainder of the site will require further detailed vegetation community and tree surveys. Plans for such works are detailed in Sections 5.2 and 6.2. The following sub-sections however, provide our initial site descriptions.

3.4.1 Site Land Cover

The site is a mosaic of cultivated cropland, treed hedgerows, fallow fields, forests, shrubland, and stream channels. Many of the trees within the hedgerows and forests on site were apparent in the 1976 air photos (Ottawa, 2017b), and larger trees are still abundant within the hedgerows and forests of site. Site land cover is described here through ELC (Lee et al., 1998).

The adjacent Drumlin Forest will not be altered by this project. It is not described in detail within this initial EIS, though the ELC mappings for that feature are included in Figure 1. Full ELC descriptions will be included in subsequent reports. Following the City's new Significant Woodland Policy, the entire area of the Drumlin Forest, except for its southeast corner and a few narrow portions of its western edge, was fully present in 1976 and thus must be deemed a Significant Woodland.

Two other small woodlots occur on the site. Woodlot 1 is a 2.5 ha Dry – Fresh Sugar Maple Deciduous Forest Ecosite (FOD5-1). This feature is predominately Sugar Maple, many of which are large (> 50 cm DBH), with subdominant species including Basswood (*Tilia americana*), Ironwood (*Ostrya virginiana*), Trembling Aspen (*Populus tremuloides*), American Beech (*Fagus americana*), Green Ash (*Fraxinus pennsylvanica*), White Birch (*Betula papyrifera*), Black Cherry (*Prunus serotina*), and American Elm (*Ulmus*

americana). Woodlot 2 is a 1.2 ha Dry – Fresh Popular Deciduous Forest (FOD3-1) with dominant species of Trembling Aspen (*Populus tremuloides*), Green Ash, and with subdominant species of Sugar Maple (*Acer saccharum*), American Elm, Black Cherry, Basswood, and Ironwood. Woodlot 1 was present on the site in 1976 and is thus considered to be a Significant Woodland. Woodlot 2 however, is younger than Woodlot 1 and is thus not deemed to constitute Significant Woodland.

A Cultural Thicket (CUT) connects Woodlots 1 and 2. This area is approximately 2.3 ha and appears to be becoming a Dry – Fresh Deciduous Shrub Thicket Ecosite (THDM2). It is composed of primarily of American Elm, Green Ash, Staghorn Sumac (*Rhus typhina*), Sugar Maple, hawthorn species (*Crataegus* spp.), apple species (*Malus* spp.), and Manitoba Maple (*A. negundo*).

A small, young, narrow band of lowland forest connects west edge of Woodlot 1 to the Drumlin Forest. The feature forms a riparian buffer to a northwest-flowing Wilson-Cowan Drain Tributary. This area is approximately 0.8 ha in area and classified as Maple Mineral Deciduous Swamp Ecosite (SWD3) and was composed primarily of Red Maple (*A. rubrum*) and Green ash, with willow shrubs (*Salix* spp.), Manitoba Maple, Trembling Aspen, and American Elm as subordinate species. The feature is not old enough, based on 1976 City air photos, to constitute Significant Woodland, but nevertheless falls entirely within the 30 m the stream channel.

The majority of the site is cultivated cropland and is classified as Open Agriculture (OAG). These fields had corn stubble visible indicating continued use of these areas for agricultural processes. A couple of these field areas have gone fallow from lack of use and now are classified as Mixed Meadow (MEM) and are a mixture of grass and forb species, many of which are invasive weed species.

The former agricultural fields at the eastern edge of site has been disturbed by construction activities associated with the development of the Phase 1 and now constitute Cultural Meadows (CUM).

3.4.2 Site Trees

The tree inventory survey was performed on February 22, 2017 and all trees on site were identified to species and diameter at breast height (DBH) was recorded (Table 1; Figure 2). Habitat classification based on ELC categories was completed on the property and locations of large potential specimen trees recorded.

Tree ages were not specifically determined, however, the 1976 geoOttawa (Ottawa, 2017b) air photo shows treed hedgerows, tree patches, and the forest on site. Subsequently, we estimate that the ages of the majority trees on site are between 40 and 60 years old. A few larger and older trees, however, that were part of the hedgerows were also identified on the site. The trees on site generally appeared to be healthy except as otherwise noted within Table 1.

Outside of the Drumlin Forest or other site woodlots, there are instances of individual or small patches of trees throughout the site. The majority of non-forest site trees occur within the numerous hedgerows present between agricultural plots or along streams. In ELC terms, they constitute Dry – Fresh Deciduous Hedgerow Thicket Ecosite (THDM3). They are composed of a combination of large trees such as Red Oak and American Elm, and shrub species such as Highbush Cranberry (*Viburnum trilobum*), apple species,

hawthorn species, and Manitoba Maple. Many of the hedgerows of site (e.g. H4 and H10) also had drainage channels within them creating a habitat supportive of Green Ash.

The hedgerows to the northwest of the site (H6) is dominated by Basswood, American Beech, and Sugar Maple. Subordinate tree species observed included Trembling Aspen, Green Ash, American Elm, Manitoba Maple, and Black Cherry.

Hedgerow H11 is located along the stream channel to the northwest of the site. It is comprised mainly of willow shrubs with Manitoba Maple, Green Ash, and American Elm scattered throughout. The north section of the stream corridor becomes forested and joins with the previously surveyed Mahogany Forest to the west, which was classified as Dry – Fresh Sugar Maple Deciduous Forest (FDO5-1) (KAL, 2014).

Butternut (*Juglans cinerea*) trees and saplings were observed on site in the north stream corridor, along the northeast hedgerow, and in the shrubland area. The locations of these trees are indicated in Figure 1.

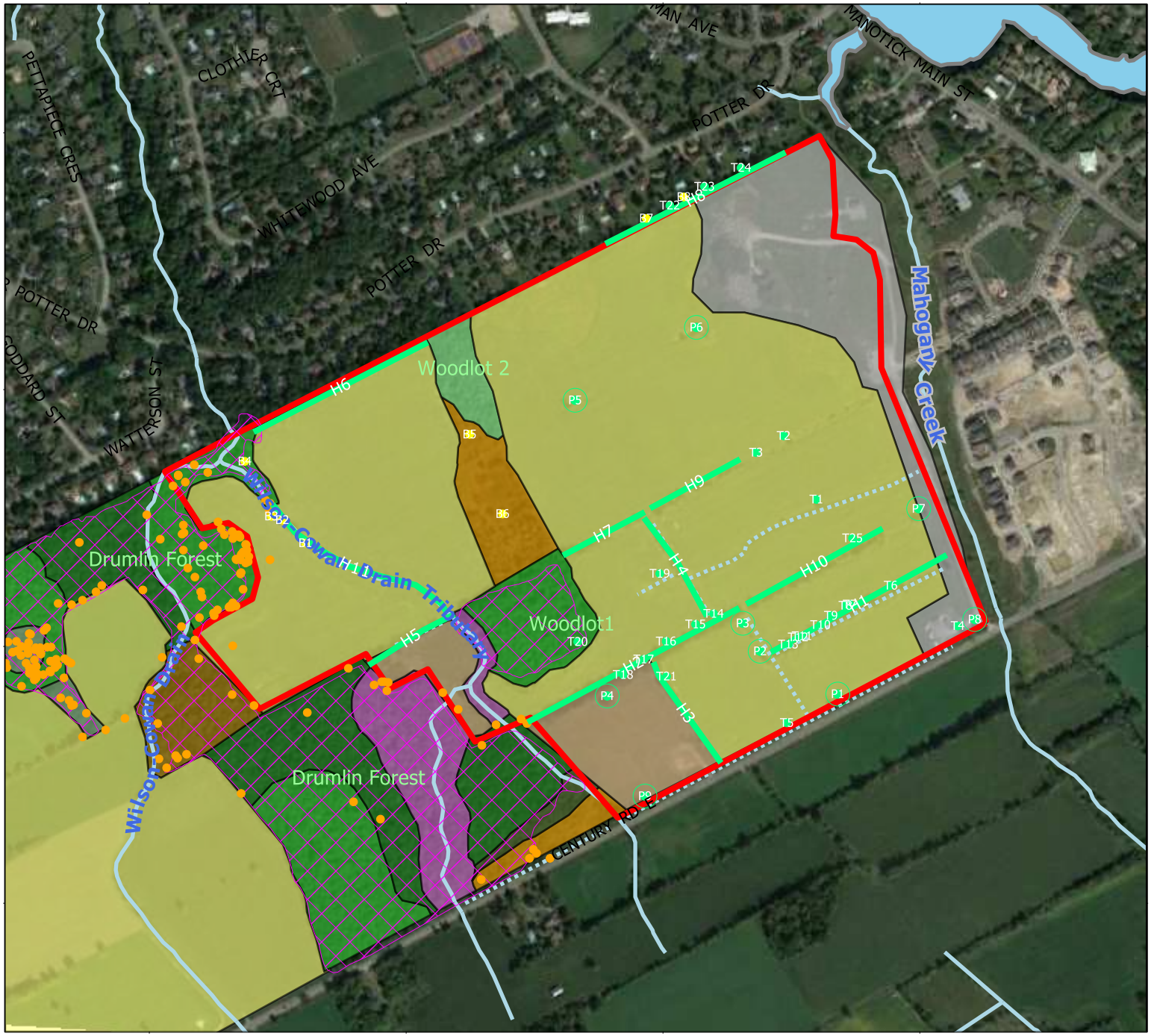

Figure 1 Tree Inventory and Vegetation Community survey results

Legend

ELC

- CUM
- CUT
- FOD3-1
- FOD4
- FOD5-1
- FOD6
- FOD7-1
- FOM6-1
- MEM
- OAG
- SWD3-1

Trees

- Hedgerow
- Patch
- Butternut
- Tree (i.e. single or notable)
- Butternut (previously identified)

Significant Woodland

N

0 250 m

Project: Minto 595 - Maps
Created By: TH
Checked By: AF
Universal Transverse Mercator - Zone 18 (N)
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KILGOUR & Associates

Table 1. Results of the tree inventory survey of the site in February 22, 2017

Location	Tree Species	Quantity	DBH (range) (cm)	Condition
Hedgerow 1	Green Ash*	1	85	
-	Green Ash*	1	61	
-	Green Ash	1	73	Some dieback
-	Green Ash	1	69	Some dieback
-	Green Ash	1	70	Some dieback
-	Green Ash*	1	64	
-	Green Ash*	1	66	
-	Green Ash*	1	68	
-	Green Ash*	1	75	
-	Green Ash	~30	15 – 30	Some saplings
-	Red Oak	7	15 – 35	Plus many saplings
-	Red Oak	5	35 – 55	
-	American Elm	9	15 – 30	Dieback and many snags (< 20)
-	Bur Oak	5	<10 – 25, and 41	
-	Manitoba Maple	~30	<10 – 25	Some saplings
-	Hawthorn species	~15	<10 – 20	
-	Apple species	~15	<10 – 25	
-	American Beech	1	20	A few saplings
Patch 1	Red Oak	2	47, 50	
-	American Elm	1	18	
Patch 2	Red Oak	2	42, 51	Some saplings
Patch 3	Green Ash	~15	<10 – 25	
-	Manitoba Maple	~5	15 – 25	
Hedgerow 2	Green Ash	1	71	Some dieback
-	Red Oak*	1	86	
-	Red Oak*	1	62	
-	Red Oak*	1	97	Some dieback
-	Red Oak*	1	109	Some dieback
-	Red Oak	~40	20 – 50	A few saplings
-	Sugar Maple	~30	20 – 50	Many saplings
-	Basswood	~25	20 – 35	A few saplings
-	Green Ash	~10	20 – 40	
-	Manitoba Maple	~10	<10 – 25	
-	White Birch	~5	15 – 25	A few saplings
-	Black Cherry	~5	15 - 25	
Patch 4	Red Oak*	1	102	Dieback
-	Sugar Maple	6	10 – 20	A few saplings
Hedgerow 3	Red Oak*	1	78	
-	Red Oak*	1	68	
-	Red Oak	~30	10 - 30	
-	Red Oak	~10	30 – 50	
-	Basswood	~5	10 – 30	
-	Manitoba Maple	~20	10 – 20	

Location	Tree Species	Quantity	DBH (range) (cm)	Condition
Hedgerow 3	American Elm	~5	10 – 30	Many snags (> 15)
-	Green Ash	2	18, 21	And a few saplings
Forest 1	American Elm	~25	15 – 30	Some dieback and many snags (>20)
-	Trembling Aspen	~100	20 – 45	
-	Green Ash	~25	15 – 35	
-	Sugar Maple	~300	30 – 60	Some dieback and large snags
-	White Birch	~35	15 – 35	A few snags
-	Basswood	~75	20 – 50	
-	Ironwood	~75	15 – 35	
-	American Beech	~20	20 – 40	
-	Sugar Maple*	1	68	Some dieback
-	Red Oak	~75	20 – 45	
-	Black Cherry	~15	15 – 30	
Hedgerow 4	Green Ash	~45	30 – 50	Much dieback
-	Red Oak	~15	20 – 40	
-	Red Maple	~20	20 – 40	
-	Manitoba Maple	~10	<10 – 20	
Lowland woodland	Green Ash	~20	15 – 30	
-	Red Maple	~20	20 – 40	
Stream Corridor	Green Ash	~15	15 – 30	
-	Manitoba Maple	~25	10 – 25	
-	Willow species	~30	<10 – 15	
-	American Elm	~10	10 – 20	Many snags and dieback
-	Trembling Aspen	~15	15 – 30	
-	Green Ash	1	54	Some dieback
-	Butternut	1	18	Mostly dead
-	Butternut	1	21	Some dieback
-	Butternut	1	20	Some dieback
Hedgerow 6	Basswood	~100	30 – 50	
-	Sugar Maple	~50	30 – 60	
-	American Beech	~75	20 – 40	
-	American Elm	~25	15 – 35	
-	Black Cherry	~25	15 – 35	
-	Green Ash	~25	20 – 45	
-	Trembling Aspen	~25	20 – 45	
-	Manitoba Maple	~25	10 – 25	
Forest 2	Trembling Aspen	~75	20 – 50	
-	American Elm	~30	20 – 30	
-	Basswood	~30	20 – 50	
-	Green Ash	~75	20 – 40	Some dieback
-	Black Cherry	~20	20 – 30	
-	Ironwood	~20	15 – 25	
-	Apple species	~15	10 – 20	

Location	Tree Species	Quantity	DBH (range) (cm)	Condition
Shrubland	American Elm	~50	20 – 40	Much dieback and many snags (> 50)
-	Green Ash	~30	10 – 35	
-	Apple Species	~20	<10 – 30	
-	Hawthorn Species	~30	<10 – 20	
-	Sugar Maple	~25	<10 – 20	
-	Manitoba Maple	~40	<10 – 30	
-	Butternut	4	<10	Saplings
Hedgerow 7	Green Ash	~20	15 – 35	Some dieback
-	American Elm	~45	15 – 40	Much dieback and many snags (> 20)
-	Manitoba Maple	~20	<10 – 30	
-	Apple species	~10	<10 – 20	
-	Hawthorn species	~10	<10 – 20	
Patch 5	Green Ash	1	61	Some dieback
-	Bur Oak	1	10	
-	American Elm	1	22	Some dieback
-	Apple species	1	10	
Hedgerow 8	Green Ash	~30	20 – 30	
-	American Elm	~35	<10 – 30	Some dieback and snags
-	Manitoba Maple	~50	<10 – 25	
-	Bur Oak	~10	<10 – 15	
-	Red Oak*	1	>80	Could not access
-	Red Oak*	1	>80	Could not access
-	Red Oak*	2	>70	Could not access
-	Trembling aspen	~20	10 – 25	
-	Butternut	2	<10, 10	Sapling and small tree
Patch 6	Red Oak*	2	65, 72	
-	Green Ash	1	>90	Some dieback, could not access
-	Manitoba Maple	~5	<10 – 30	
-	American Elm	~8	<10 – 20	Some dieback
-	Green Ash	~6	15 – 30	
Tree 2	Manitoba Maple	1	31	
Tree 3	American Elm	1	29	
Hedgerow 9	American Elm	~25	15 – 40	Some dieback and snags (>10)
-	Apple species	~20	<10 – 25	
-	Hawthorn species	~20	<10 – 15	
-	Manitoba Maple	~20	10 – 30	
-	Green Ash	~10	20 – 50	Some dieback
Tree 1	American Elm	1	10 – 35	Multi-stem (5)
Hedgerow 10	American Elm	~35	10 – 35	Some dieback and snags
-	Green Ash	~30	25 – 50	Some dieback
-	Manitoba Maple	~25	10 – 25	
-	Hawthorn species	~15	<10 – 15	
-	Red Oak	~15	30 – 60	
-	Bur Oak	~5	10 – 20	

Location	Tree Species	Quantity	DBH (range) (cm)	Condition
Hedgerow 10	Green Ash	1	77	Some dieback
Patch 7	Red Oak*	2	52, 77	
-	Apple species	1	16	
-	Manitoba Maple	6	10 – 35	
Tree 4	American Elm*	1	76	Some dieback
Patch 8	Red Oak*	1	97	Some dieback
-	Red Oak	5	10 – 40	
Tree 5	Green Ash	1	15 – 25	Some dieback and a snag
Patch 9	Red Oak	~5	15 – 30	
-	American Elm	~10	<10 – 25	Some dieback and snags
-	Green Ash	~5	20 - 30	
-	Manitoba Maple	~10	<10 – 20	

* = Notable tree

Ecological Significance of Site Trees and Site Woodlands

Twenty-one trees on the site were flagged as being both large (*i.e.* > 50 cm DBH) and in good health. These trees include mostly Red Oaks and Sugar Maples. Most larger Green Ash on the site showed some signs of dieback suggesting infestation with Emerald Ash Borer (EAB; *Agrilus planipennis*). A few ash trees were included on the list of flagged trees as they had not suffered obvious dieback. They may however, be removed later from the list after closer examination at leaf-on and/or as EAB continues to spread through the area. One particularly large American Elm was also included; it had only limited Dutch Elm's Disease (DED) related dieback. The majority of these notable trees were located in the hedgerows, but one particularly large Sugar Maple was observed in Woodlot 1.

Woodlot 1 contained many large cavity trees and snags at a rate greater than the 10 per ha. This abundance of snags on site would qualify the habitat as a candidate for maternity colony roost habitat for bats. Additional species specific field studies are proposed for the site to determine SAR Bat use of this forest.

3.5 Significant Woodland

The Manotick Drumlin Forest is a significant woodland that has been studied multiple times in the past (KAL, 2014; Ecotec, 2007; MMM and WESA, 2007; Brunton, 1997). The forest is approximately 19 ha in area and is a mature deciduous forest made up of seven ELC habitats. The majority of these habitats are deciduous forest ecosites, many are considered lowland forests, and one is a swamp habitat. Two agricultural drains cross the Drumlin Forest, which align with the wet forest and swamp habitats. Air photos from 1976 (Ottawa, 2017b) show the same forest area as today.

Previous studies of the Drumlin Forest indicated a diversity of wildlife present. Breeding bird surveys of the forest observed 40 species within the forest. Amphibian call surveys were also performed of the forest and four frog species were recorded. Additional to these wildlife species, two reptiles were observed on the site.

The significance of the other wooded site areas has not been previously studied. Under the City's new Woodland Policy, woodland significance within the urban boundary is not determined following *NHRM* guidelines. Rather, Significant Woodlands are defined as areas of forest (as per ELC or Forestry Act definitions) that covered more than 0.8 ha in 1976. At that time, the site treescape appeared somewhat similar to its current arrangement. The hedgerows and tree patches were visible but less well developed and the cultivated fields were in the same locations. The large Green Ash and Red Oak found in in the hedgerows were visible in the air photo. Woodlot 1 is clearly present in the 1976 air photo at much the same size as is seen today, though it was disconnected then from the Drumlin Forest. Woodlot 2 however, was only a small treed patch (<0.5 ha) and the thicket between was non-existent.

3.6 Species at Risk

A natural heritage information request was submitted for the site on January 23, 2017. At the time of preparing this report no response has been received from the MNRF. Our internal review of background natural heritage data for the site draws from similar sources as the MNRF review and includes the NHIC database, taxonomic atlases, and knowledge of species habitats and distributions. The KAL internal review of SAR with the potential to occur on site indicated 19 total species listed under the *Endangered Species Act* (Ontario, 2007) and *Species at Risk Act* (Canada, 2002) to occur on or in proximity to the property. These include Bank Swallow (*Riparia riparia*), Barn Swallow (*Hirundo rustica*), Blanding's Turtle (*Emydoidea blandingii*), Bobolink (*Dolichonyx oryzivorus*), Butternut, Canada Warbler (*Cardellina canadensis*), Eastern Meadowlark (*Sturnella magna*), Eastern Whip-poor-will (*Antrostomus vociferus*), Eastern Wood-pewee (*Contopus virens*), Monarch (*Danaus plexippus*), Olive-sided Flycatcher (*Contopus cooperi*), Short-eared Owl (*Asio flammeus*), Snapping Turtle (*Chelydra serpentina*), Wood Thrush (*Hylocichla mustelina*), Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), Tri-colored Bat (*Perimyotis subflavus*), and Western Chorus Frog (*Pseudacris triseriata*).

For full due diligence, Table 2 indicates the habitat requirements of these SAR and an assessment of potential presence of site or within the broader area.

Table 2: Species-at-risk with potential to occur on the project site.

Species Name	Scientific name	Provincial (ESA) Status	COSEWIC Status	Federal (SARA) Status	Habitat Preferences in Ontario	Habitat on Site	Project Concerns Associated with Habitat on Site
Amphibians							
Western Chorus Frog	*Pseudacris triseriata*	no status	threatened (Great Lakes / St. Lawrence - Canadian Shield population)	threatened (Great Lakes / St. Lawrence - Canadian Shield population)	Inhabits forest openings around woodland ponds but also uses damp meadows, marshes, bottomland swamps, and temporary ponds in open country and urban areas. Breeds in many aquatic habitats characterized by depth of >10 cm and no fish.	The Drumlin Forest as well as woodlands and drains on site may contain breeding areas for the species.	Moderate potential for occurrence. Amphibian surveys are recommended to determine presence on site.
Birds							
Bank Swallow	*Riparia riparia*	threatened	threatened	no status	Colonial nester; burrows in eroding silt or sand banks, sand pit walls, and other similar habitats.	Nesting habitat unlikely to occur on site; however, species is likely to forage in open habitats on site.	Low potential for occurrence, not a concern.
Barn Swallow	*Hirundo rustica*	threatened	threatened	no status	Species prefers to nest on manmade structures such and bridges, barns, and buildings near open terrestrial and aquatic habitats where it forages.	Nesting habitat unlikely to occur on site; however, species is likely to forage in open habitats on site.	Low potential for occurrence, not a concern.
Bobolink	*Dolichonyx oryzivorus*	threatened	threatened	no status	Periodically mown, dry meadow for nesting. Habitat (meadow) should be > 10 ha, and preferably > 30 ha before bobolink are attracted to the site. Not near tall trees	Nesting habitat is likely to occur on site in agricultural lands.	High potential for occurrence. Breeding bird surveys are recommend for the site to determine species presence.
Canada Warbler	*Wilsonia Canadensis*	special concern	threatened	threatened	Species prefers to nest in a range of wet forest types with a well-developed understory.	The Drumlin Forest may present potential nesting habitat for species.	Moderate potential for occurrence; however previous breeding bird surveys of Drumlin

Species Name	Scientific name	Provincial (ESA) Status	COSEWIC Status	Federal (SARA) Status	Habitat Preferences in Ontario	Habitat on Site	Project Concerns Associated with Habitat on Site
							Forest found no presence.
Eastern Meadowlark	*Sturnella magna*	threatened	threatened	no status	Prefers grasslands and pastures >5 ha in area with moderately tall grasses (25 to 50 cm) and abundant litter cover. High proportion of grasses to forbs and shrubs (<35% forbs and shrubs).	Nesting habitat is likely to occur on site in agricultural lands.	High potential for occurrence. Breeding bird surveys are recommend for the site to determine species presence.
Eastern Whip-poor-will	*Caprimulgus vociferus*	threatened	threatened	threatened	Species prefers areas that are a mix of open and forested habitats such as savannahs, open woodlands, or forest openings. It nests on the ground or forest floor and has cryptic coloured eggs and are hidden from visual predators.	Nesting habitat may be present on site in open habitats in the Drumlin Forest and woodlands on site.	Moderate potential for occurrence. Eastern Whip-poor-will surveys should be completed of the site to determine species presence.
Eastern Wood-Pewee	*Contopus virens*	special concern	special concern	no status	Prefers mature and intermediate-aged deciduous and mixed forest with an open understory. Often nests and forages near open areas and forest edges.	Nesting habitat is likely to occur on site in Drumlin Forest and woodlands.	High potential for occurrence. Pervious breeding bird surveys found presence of species in Drumline Forest; however, there is no habitat protection for this species under the *ESA*.
Henslow's Sparrow	*Ammodramus henslowii*	endangered	endangered	endangered	Species prefers open fields with tall grass and flowering plants with scattered shrubs.	There is potential nesting habitat in agricultural areas on site; although, species has not been observed in the Ottawa area for many years.	Low potential for occurrence. Breeding bird survey should be completed to determine species presence.

Species Name	Scientific name	Provincial (ESA) Status	COSEWIC Status	Federal (SARA) Status	Habitat Preferences in Ontario	Habitat on Site	Project Concerns Associated with Habitat on Site
Olive-sided Flycatcher	*Contopus cooperi*	special concern	threatened	threatened	Found along edges of coniferous and mixed forests often adjacent to rivers or wetlands.	Nesting habitat may be present in the Drumlin Forest.	Moderate potential for occurrence; however previous breeding bird surveys of the Drumlin Forest did not detect species presence.
Short-eared Owl	*Asio flammeus*	special concern	special concern	special concern	Nests on the ground in a variety of open habitats including tundra, grassland, peat bogs, and old pastures.	Agricultural and grassland habitats of site have the potential to provide nesting habitat.	Moderate potential for occurrence. Breeding bird survey are recommended for the species.
Wood Thrush	*Hylocichla mustelina*	special concern	threatened	no status	Moist deciduous hardwood or mixed forests with trees >16 m in height, a closed canopy (>70%), moderate sub-canopy and shrub layer, fairly open forest floor, and moist soil.	Nesting habitat is likely to occur on site in Drumlin Forest and woodlands.	High potential for occurrence; however, there is no habitat protection for this species under the *ESA*.
Insects							
Monarch	*Danaus plexippus*	special concern	endangered	special concern	Caterpillars require milkweed (*Asclepias* sp.) and typically found in meadow, grassland, and old field habitats, while adults feed on nectar of a variety of plants.	Grassland and old field habitats on site are likely to have milkweed species present.	Moderate potential for occurrence; however, there is no habitat protection for this species under the *ESA*.
Mammals							
Eastern Small-footed Myotis	*Myotis leibii*	endangered	no status	no status	Species maternity roost include coniferous forest in hilly country and rocky outcrops and cliffs. Hibernate in small caves.	The Drumlin Forest and woodlands on site are unlikely to provide maternity roost or hibernacula habitat.	Low potential for occurrence. Species is unlikely to use Drumlin Forest and woodland on site.

Species Name	Scientific name	Provincial (ESA) Status	COSEWIC Status	Federal (SARA) Status	Habitat Preferences in Ontario	Habitat on Site	Project Concerns Associated with Habitat on Site
Little Brown Myotis	*Myotis lucifugus*	endangered	endangered	endangered	Widespread, roosting in tree cavities and buildings. Hibernate in caves or abandoned mines.	Maternity Roost habitat is likely in the Drumlin Forest and woodlands on site. No potential hibernacula is likely on site.	High potential for occurrence. Bat maternity habitat surveys should be performed on site to determine potential for presence.
Northern Long-eared Bat	*Myotis septentrionalis*	endangered	endangered	endangered	Associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. Hibernate in caves or abandoned mines.	Maternity roost habitat is unlikely to be found in the forests on site. No hibernacula habitat is likely to occur on site.	Low potential for occurrence. Species is unlikely to use Drumlin Forest and woodland on site.
Tri-colored Bat	*Perimyotis subflavus*	endangered	endangered	endangered	Maternity roosts are located in trees in older forests or barns and other structures. Hibernate in caves or abandoned mines.	Maternity Roost habitat is likely in the Drumlin Forest and woodlands on site. No potential hibernacula is likely on site.	High potential for occurrence. Bat maternity habitat surveys should be performed on site to determine potential for presence.
Trees							
Butternut	*Juglans cinerea*	endangered	endangered	endangered	Variable but typically on well-drained soils in areas of full sun or partial shade.	Forest edges and hedgerows on site are likely to provide habitat for species.	High potential for occurrence. Previous surveys of the Drumlin Forest observed to species on site. Vegetation surveys of the site are recommended to determine species presence on remained of site.
Turtles							

Species Name	Scientific name	Provincial (ESA) Status	COSEWIC Status	Federal (SARA) Status	Habitat Preferences in Ontario	Habitat on Site	Project Concerns Associated with Habitat on Site
Blanding's Turtle	*Emydoidea blandingii*	threatened	endangered	threatened	Prefer shallow water usually in large wetlands or shallow lakes with a high abundance of emergent vegetation and hibernate in the mud at the bottom of permanent water bodies from late October until the end of April. Species can be found hundreds of meters from water when looking for mates and nesting sites.	Species is unlikely to use drains or wetlands on site as they do not meet habitat preferences; however, they may be found on site while searching for nesting sites.	Low potential for occurrence. Visual encounter surveys performed during other field surveys on the site will help to determine presence on the site.
Snapping Turtle	*Chelydra serpentina*	special concern	special concern	special concern	Freshwater habitat characterized by slow-moving water with a soft mud bottom and dense aquatic vegetation. Can use habitats ranging in size from lakes to ditches. Hibernates in mud or silt bottoms of lakes and rivers. Uses gravel or sandy areas near aquatic habitats for nesting.	Species is likely to use drains and wetlands on site as refuges as they search for nesting areas.	High potential for occurrence, and species observed on site during previous surveys of the Drumlin Forest; however, there is no habitat protection for this species under the *ESA*.

Species occurring or potentially having habitat on site.

Eleven of the SAR with the potential to occur on or adjacent on the site are birds. The Drumlin Forest and woodlands on site provide potential nesting habitat for many bird species, and previous breeding bird surveys of the Drumlin Forest (KAL, 2014) recorded 40 bird species. The open habitats on site also have the potential to provide nesting habitat for other SAR birds, such as Bobolink and Eastern Meadowlark. Because of this we recommend that breeding bird surveys of the site be completed in the 2017 field season to support Phase 2 development of the Mahogany project.

Western chorus frog is the only amphibian SAR with the potential to occur on the site, but many other amphibian species are likely to be found here. During previous survey of the Drumlin Forest (KAL, 2014) four amphibian species were observed: Spring Peeper (*Pseudacris crucifer*), Wood Frog (*Lithobates sylvaticus*), American Toad (*Anaxyrus americanus*), and Gray Tree Frog (*Hyla versicolor*). We recommend that amphibian call surveys be completed of the site in the 2017 to determine presence and abundance amphibian species remainder of the site.

There is potential for bat maternity roosting habitat site within the Drumlin Forest and woodlands. Previous surveys of tree cavities and snags in the Drumlin Forest (KAL, 2014) found no evidence of bat roosts. The other woodlands to the northwest of the Drumlin forest and the hedgerows on site have the potential to provide bat roosting habitat. Vegetation community and tree inventory surveys of the site will be used to determine the potential for bat roosting habitat on the remained of the site by classification of snags and large cavity trees.

3.7 Other Natural Heritage Features

There are no provincially or locally significant wetlands or significant Valleylands on or adjacent to the site (**Error! Reference source not found.**).

4.0 PROJECT DESCRIPTION

The ultimate community design and street layout for this project has not yet been finalized. Key features of the design relevant to the preservation/protection of the site natural heritage however, are consistent among design options (Appendix 3). The Drumlin Forest and Woodlot 1 will be retained in their current configurations (i.e. same footprint). A woodland management plan will be developed in consultation with the City to explore and define how these features can be best integrated into the new surrounding communities by permitting enhanced recreational opportunities (e.g. pathway networks) while protecting the existing forestscape. Full 30 m setbacks will be included along the sites major drainage features with existing vegetation therein preserved and enhanced. Site drainage will be managed through the use of two or three stormwater management pond areas.

Final community designs will be determined in part on the results 2017 field work studies.

5.0 IMPACT ASSESSMENT

5.1 Impacts to Surface Water Features

All development proposed for the Phase 2 area will respect appropriate setbacks (as determined within the Jock River SWS) for Mahogany Creek and both of the Wilson-Cowan Drain features to protect these reaches. The small agricultural drains along the site hedgerows, roadside ditches and any other swales crossing the area however, are likely to be removed as the site is graded, with all site surface flows being addressed by the stormwater management plan for the area. It is likely that these small waterways only contain water during the spring freshet and precipitation events, and are dry during for the majority of summer and fall. Regardless, detailed characterizations of these features and an assessment of their ecological function and value will be fully determined as part of the HDFA. Mitigation of impacts associated with the alteration of these features will be addressed through the stormwater management plan and/or through other improvement projects to drainage fabric of the broader catchment(s) which will be determined through consultation with the RVCA to a level consistent with the ecological valuations of the existing features as determine through the HDFA.

5.2 Impacts to Vegetation, Trees and Significant Woodlands

Trees within Woodlot 1 are likely to provide preferred habitat for many wildlife species. This is an old growth Sugar Maple forest that contains many tree cavities and snags that provide potential nesting and roosting habitat for wildlife. The Drumlin Forest that borders the west of the site also contains old growth forest areas that provide habitat to wildlife species. These feature will be fully preserved. The younger Woodlot 2 and its scrubland extension to Woodland 1 however, will not be.

Outside of the forested areas, most of the trees on site are located in hedgerows and patches between cultivated fields and along the stream corridors. Some large native trees were observed in the hedgerows, such as Green Ash and Red Oak, but these areas were mostly composed of small trees, saplings, and shrub species. The large trees are unlikely to provide high quality wildlife habitat due to the linear composition of the hedgerows, which do not provide adequate cover or foraging areas for bats, birds, and other wildlife species. These trees do however, contribute to the overall canopy cover of the City.

Trees within the retained drain corridors will be maintained. Other trees on site will be removed. A tree planting plan for the project will be created and will call for planting densities equivalent to one tree per lot, with additional tree plantings in public areas and along new SWM features. Given the very low tree stem density currently on site (outside of the forest features to be retained), these measures are anticipated to generate a significant increase in municipal tree canopy cover. The expected increase in canopy density will be determined as part of the final EIS and/or landscape plan. Additionally, mitigation measures for the protection of retained trees will be implemented on site during project development as per Section 6.1.

5.3 Impacts to Species at Risk

The only SAR observed on site during the preliminary field survey were Butternuts, but this survey was completed outside of the active season for many wildlife species (February 22, 2017). The hedgerows on site are not predicted to provide significant wildlife habitat due to their linear composition and the lack of

foraging areas nearby. The majority of the butternut observed on site were saplings with a few trees observed that showed signs of Butternut Canker (*Sirococcus clavigignenti-juglandacearum*) disease.

A Butternut Health Assessment (BHA) of the Drumlin Forest (KAL 2014) found a further 174 Butternuts within the feature. Of these, 70 within 50 m of the Phase 2 area were found to be either "retainable" or "archivable". Some of these may be located sufficiently in from the forest edge to be fully protected by the development buffer around the forest, but the number of trees impacted will almost certainly be larger than ten. As such, a "Net Benefit" permit – also referred to as a "C Permit" must be negotiated with MNFR prior to site development. The C permit will specify the appropriate mitigations to ensure the proposed development provides a net benefit to the species despite an harm to, or removal of, individuals. Mitigations can include such measures as planting new Butternut saplings or funding seed collection or other research programs aimed at fighting Butternut Canker. The full level of compensation required will be based on an updated BHA to be completed in the late spring of 2017.

Other SAR are predicted to occur on site. Additional field surveys will be performed on site to determine the presence of species that have a potential to occur. Table 1 includes 14 species that have some potential to occur on site. Species specific field surveys will be completed on site to determine presence of these species in 2017. Any additional SAR or SAR habitats found on site will either be protected through adjustments to the community design and/or the construction practices used to build the community, or will removed/relocated under compensation programs to be negotiated with the MRNF that will ensure an overall net benefit for those species.

5.4 Impacts to Wildlife

The agricultural composition of the site makes it unlikely to support a large and diverse wildlife community. The linear nature of the hedgerows will provide only limited cover for wildlife species and minimal connectivity to other areas as urban development has already been complete to the north and is well under way to the east. Development in these areas is not anticipated to have significant negative impacts on wildlife in the area.

The larger, older forest areas are more likely to provide wildlife habitat to many species, albeit primarily of urban tolerant species. As these features (i.e. the Drumlin Forest and the Woodlot 1) will be retained, and will maintain their current level of connection to forested areas to the south (i.e. across Century Rd. and/or along corridors of the Wilson-Cowan Drain channels), negative impacts to resident wildlife there are anticipated to be minimal. Wildlife presence on site will be (re)confirmed through field surveys in 2017. Incidental observation of wildlife will be recorded during field surveys, and the repeated visits will contribute further to our understanding of the wildlife community there.

6.0 MITIGATIONS

6.1 Mitigations for Surface Water Features

Prior to any project development, an HDFA will be completed to assess the ecological value of all site drainage features to the broader catchment. This information will be used to inform the full EIS and make decisions related to project development and the drains. The alteration of fish habitat could also require consultations with DFO for either a Fisheries Authorization (FA) or a Letter of Advice indicating an FA is

not required. Consultation with DFO begins with the submission of a Request-for-Review, which will be based on information from the HDFA and EIS. The final set of mitigations required to minimize impacts to surface water features and/or compensation measures necessary to offset any unmitigable impacts will be determined in consultation with the RVCA, the City and, potentially, DFO. All mitigation/compensation measures imposed under permits to alter a waterway, fisheries authorizations, letters of advice, and/or draft plan conditions will be implemented accordingly.

6.1.1 Headwater Drainage Features Assessment

The HDFA will evaluate site surface-water features according to hydrology, riparian condition, fish and amphibian populations and habitat, and terrestrial habitat. This assessment will identify the overall functionality of the drains on site to the broader watershed and determine an appropriate level of conservation/mitigation in relation to a proposed development.

Fieldwork for the HDFA will require three rounds of site visits: two rounds in early spring with a third round in early summer. A fourth visit in late summer may be required but is not anticipated to be needed here as historical air photos suggest most ditches and swales will be dry before this point. During the HDFA, we will census fish communities on site, and fully characterize the channels with respect to morphology, substrate and habitat potential. Fish censuses will be done in the spring under a permit from the MNRF, which we will obtain. Three frog surveys, performed as part of the full EIS, will also inform the HDFA. The summer round(s) of HDFA field work will re-examine the site in low water conditions.

The alteration of fish habitat could also require consultations with DFO for either a Fisheries Authorization (FA) or, more likely, a Letter of Advice indicating an FA is not required. Consultation with DFO begins with the submission of a Request-for-Review. The Request-for-Review is based on information from the HDFA and EIS. KAL will generate and submit to DFO the Request-for-Review accordingly.

6.2 Mitigations for Trees

Please note that this report does not constitute permission to remove any trees from the site. Removal of trees can only be undertaken upon the issuance of a tree removal permit from the City of Ottawa. This report may be used to support the application for that permit and to advise mitigation measures imposed by the permit. Accordingly, to minimize impact to the remaining trees on the property, the following protection measures are indicated as necessary during construction:

- Tree removal on site should be limited to that which is necessary to accommodate site construction.

- To minimize impact to remaining trees during future site development:

    - Erect a fence beyond the critical root zone (CRZ, i.e. 10 x the trunk diameter) of trees. The fence should be highly visible (e.g. orange construction fence) and paired with erosion control fencing. Pruning of branches is recommended in areas of potential conflict with construction equipment;

    - Do not place any material or equipment within the CRZ of the tree;

- Do not attach any signs, notices or posters to any tree;
- Do not raise or lower the existing grade within the CRZ without approval;
- Tunnel or bore when digging within the CRZ of a tree;
- Do not damage the root system, trunk or branches of any tree; and
- Ensure that exhaust fumes from all equipment are NOT directed towards any tree's canopy.

- The *Migratory Bird Convention Act* (Canada, 1994) protects the nests and young of migratory breeding birds in Canada. The City of Ottawa guidelines stipulate no clearing of trees or vegetation between April 1 and August 15, unless a qualified biologist has determined that no nesting is occurring within 5 days prior to the clearing (Ottawa, 2017c).

As part of the Community Development Plan for the project an Environmental Management Plan shall be created, which will include a tree planting plan. This will suggest the number of trees to be planted on site and the preferred species. This will also include setback distances for trees from residential properties, streets, sidewalks, and other infrastructure.

We propose conducting a late spring surveys to determine the presence of Butternut on site, and general characteristics of the site in regards to woodlands, hedgerows, and habitats on site. This survey will be focused on the small woodland located in the center of the site, hedgerows, and agricultural fields, and mapping of agricultural drains on site.

6.3 Mitigations for SAR

Mitigations to protect SAR (wildlife generally) will depend upon the specific species found to occur on or adjacent to the site. Multiple field surveys are thus required to determine the presence of wildlife species and SAR. These include amphibian calling surveys, breeding bird surveys, and Blanding's Turtle surveys. All of these surveys will be completed in the 2017 field season, and will be explained in greater detail in the following sections.

6.3.1 Butternut Health Assessments

Butternut were observed on the site during the preliminary field survey, and therefore the following mitigation measures should be followed:

- No tree cutting, clearing or site alteration allowed on sites where Butternut may be present, unless a thorough search has confirmed that no Butternut are located in or adjacent to the proposed work area.
- A qualified Butternut Health Assessor will assess any Butternut identified in or adjacent to the proposed work area, using MNRF methodology to determine whether or not they are "retainable," *i.e.*, sufficiently healthy to be protected under the *ESA* (2007).

- Retainable Butternut will not be harmed or removed without authorisation from the MNRF. City of Ottawa permits for the removal of trees in the urban area do not apply to butternut in the absence of the required authorisation from MNRF.

- Significant habitat for Butternut is generally defined as a minimum 50 m radius around the trunk of each retainable Butternut for which no authorisation is obtained. No negative impacts are permitted within or adjacent to significant habitat for an endangered species under the provisions of the *Planning Act* and Provincial Policy Statement. Any encroachment within the 50 m setback must be supported by a prior written assessment by a qualified individual (a Registered Professional Forester or Professional Arborist) justifying the designation of a reduced area of significant habitat.

6.3.2 Amphibian Calling Surveys

Three rounds of amphibian surveys are proposed for the site in 2017. These surveys will follow protocols set forth by the Marsh Monitoring Program (Bird Studies Canada, 2003) and will inform both the final EIS and the HDFA. Three surveys will be completed to identify early, mid, and, late season breeding amphibian species in April, May, and June, respectfully. Survey shall be completed on nights of calm weather with temperatures above 5°C, 10°C, and 17°C for each of the three respective survey periods.

- Early breeders: above 5°C - Wood Frog, Chorus Frog, Spring Peeper

- Middle breeders: above 10°C - Northern Leopard Frog, Pickerel Frog, Mink Frog, American Toad, Grey Treefrog

- Late breeders: above 17°C - Green Frog, Bullfrog.

Surveys will begin a half hour after sunset and finish by midnight, and will consisting of a three-minute recording period preceded by one-minute habituation period. Amphibian species will be recorded at each point along with estimates of distance from observers, abundance codes, estimate of individuals, and estimated direction. The survey area is a semi-circle around the observer up to 100 m that focus on aquatic habitats.

6.3.3 Morning Bird Surveys

Three rounds of breeding bird surveys are proposed for the site in 2017, and breeding bird surveys (BBS) will follow guidelines from Bird Studies Canada (BSC; Bird Studies Canada, 2001). The period for BBS in the Ottawa regions begins on May 24 and ends on July 10, and each BBS round will be performed a minimum of 10 days apart.

The BSC protocol calls for two rounds of BBS, but the MNRF requires three rounds of surveys for sites with potential for SAR birds. The surveys shall be performed on calm weather days with no precipitation from one half hour before sunrise until 11 am. Surveys will be 10-minutes in duration with a one-minute habituation period preceding the surveys. All birds seen and heard shall be recorded along with associated breeding codes, and the estimated distance from the observer.

These surveys will identify all breeding birds on site and the habitats in which they are found. Surveys will be completed in all habitats on site to allow for associations between species and habitats. An estimate of abundance for bird species will be determined for the different habitats on site. Searches will also be conducted specifically of barn structures on site to ascertain Barn Swallow presence.

6.3.4 Evening Bird Surveys

Eastern Whip-poor-will (EWPW) surveys are proposed for the site in the 2017 field season following protocols set forth by the MNRF draft survey plan (MNRF, 2014). Three rounds of surveys will be completed that correspond with the lunar phases of May and June. Surveys will begin at least a half hour after sunset while the moon is at least 50% illumined or within five days of the full moon while the moon is above the horizon, and during the EWPW breeding season from May 18 through June 30.

Surveys will be five-minutes in duration, preceded by a two-minute habituation period. The surveys will entail two observers recording EWPW calls and direction from multiple survey stations that give thorough coverage of the site (i.e., approximately 500 m apart). Weather conditions during surveys must be calm with <50% cloud cover, no precipitation, and temperatures above 10°C. Triangulation of from multiple points during recurring surveys will allow for an estimation of breeding territories using the collected data.

6.3.5 Bat Surveys

Acoustic monitoring surveys are required for areas that are considered potential high quality maternity roosting habitat (i.e. 10 or more snags per ha) (MNRF, 2015). The central forest on site meets this definition, and therefore will require acoustic monitoring surveys to determine the presence of SAR bats on site.

We propose a phased acoustic monitoring plan within the central forest on site. Phase one of the acoustic monitoring will entail the placement of two SM3BAT ultrasonic acoustic monitors (Wildlife Acoustic Inc.) within the moderate habitat, focused on areas of likely maternity roosts. We propose to run the SM3BATs for five days in early June, 2017, after which we will access and analyze the data to determine if SAR bats were recorded. Data collected during acoustic monitoring will be analyzed using Sonobat identification software and/or Kaleidoscope bat identification software (Wildlife Acoustics Inc).

If no SAR bats are recorded at the site during this initial acoustic monitoring run, we will adjust the placement of the acoustic monitors to better isolate potential maternity roost habitat. Then we will run the survey for an additional five days. If no SAR bats are detected, we will conclude the project area does not provide maternal roosting habitat.

If, during the first phase of the program, the presence of SAR bats are identified, phase two of the study will involve emergence surveys of potential high quality snags on site (i.e. tree with large DBH, many cavities present, and flaking bark). These surveys will combine visual observation with acoustic monitors (SM43BAT) to record bat species emerging from maternity roosting structures for nightly foraging. Surveys will begin one half hour before sunset on calm and clear evenings with temperature above 10°C. Observers will position themselves to allow for observations of possible bat emergence points on these

structures. Surveys will begin one half hour before sunset and the visual component of the survey will end once light conditions are that so bats can no longer be observed. SM3BAT monitors will be allowed to run for the rest of the night to capture any bats that may emerge later.

6.3.6 Turtle Surveys

Basking turtle surveys for Blanding's Turtles may be required on the site dependent on the results of the natural heritage information review from the MNRF. Turtle surveys will follow protocols from the Survey Protocol for Blanding's Turtle in Ontario (MNRF, 2015). The protocol calls for five rounds of surveys beginning after ice-off in April and ending by June 15.

Surveys will be performed between 9 am and 5 pm during sunny periods and when air temperature is at least 10°C or on cloudy days when temperature is a least 15°C. Survey stations should be in areas of open water with rocks, emergent vegetation, and woody debris that supply basking areas for turtles. These areas will be slowly approached and scanned with binoculars of at least 10x power.

6.4 Mitigations for Wildlife

Common wildlife species were observed on site during the field visit. The following mitigation measures shall be implemented during construction of the project on site:

- Areas shall not be cleared during sensitive time of the year for wildlife, unless mitigation measures are implemented and/or the habitat has been inspected by a qualified biologist.
- Site clearing should begin from the developed area in the east and proceed westward to drive any wildlife towards available retained habitat.
- Do not harm, feed, or unnecessarily harass wildlife.
- Food wastes and other garbage – effective mitigation measures include waste control (prevent littering); keeping all trash secured in wildlife-proof containers, and prompt removal from the site (especially in warm weather).
- Drive slowly and avoid hitting wildlife where possible.
- Shelter – effective mitigation measures include covering or containing piles of soil, fill, brush, rocks and other loose materials; capping ends of pipes where necessary to keep wildlife out; ensuring that trailers, bins, boxes, and vacant buildings are secured at the end of each work day to prevent access by wildlife.
- Checking the work site (including previously cleared areas) for wildlife, prior to beginning work each day;
- Inspecting protective fencing or other installed measures daily and after each rain event to ensure their integrity and continued function; and,
- Monitoring construction activities to ensure compliance with the project-specific protocol (where applicable) or any other requirements.

These mitigations will be fully captured within a Wildlife Construction Protocol for this project.

7.0 SUMMARY AND RECOMMENDATIONS

It is our professional opinion that additional field surveys should be completed on the property to determine presence of species-at-risk and other wildlife species. This information will be used in combination with these data collected during the preliminary field surveys to inform an Environmental Impact Statement for the project site. From this information, we can reduce impacts to natural heritage features through the use of

Regards,
KILGOUR & ASSOCIATES LTD.

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Terry Hams, MSc.	Anthony Francis, PhD.
Ecologist	Senior Ecologist/Project Manager

Appendix 1
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Appendix 2
Qualifications of Report Author

Anthony Francis, PhD

Dr. Francis is an ecologist with over 18 years of experience in both terrestrial and aquatic projects. His doctoral thesis work on global plant diversity patterns included conducting tree surveys across North America. As a consulting ecologist he has worked on diverse ecological projects including literature reviews of forestry management and species-at-risk; environmental studies of contaminants (metals and suspended particulates); geomatic and statistical analyses for federal and provincial ministries as well as for private industry; and aquatic and terrestrial species inventories. He has contributed to environmental impact statements and federal environmental screening assessments for creek realignments and other infrastructure projects across Ontario.

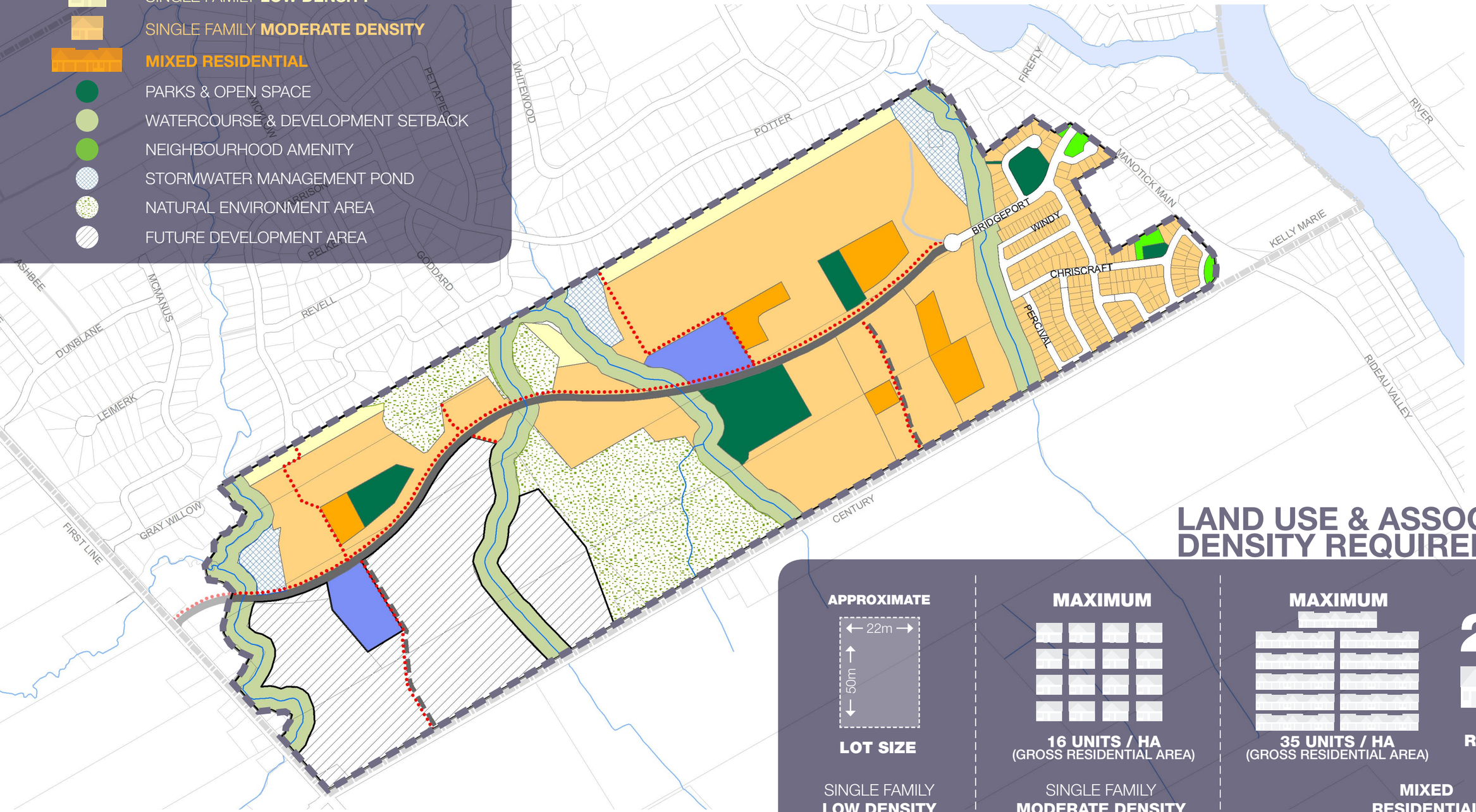
Terry Hams M.Sc.

Terry is a terrestrial ecologist with over 10 years of experience in terrestrial field work and five years of experience in ecological consulting. He has worked on various projects across the United States and Canada surveying for terrestrial plants and wildlife. Terry has worked on Environmental Assessments for potash mines, Environmental Impact Statements, Constraints Assessments, and Species at Risk Assessments. He has experience preforming of Species at Risk surveys across Canada and has extensive knowledge of terrestrial plant and wildlife species.

Appendix 3
Potential Community Design Options

LEGEND

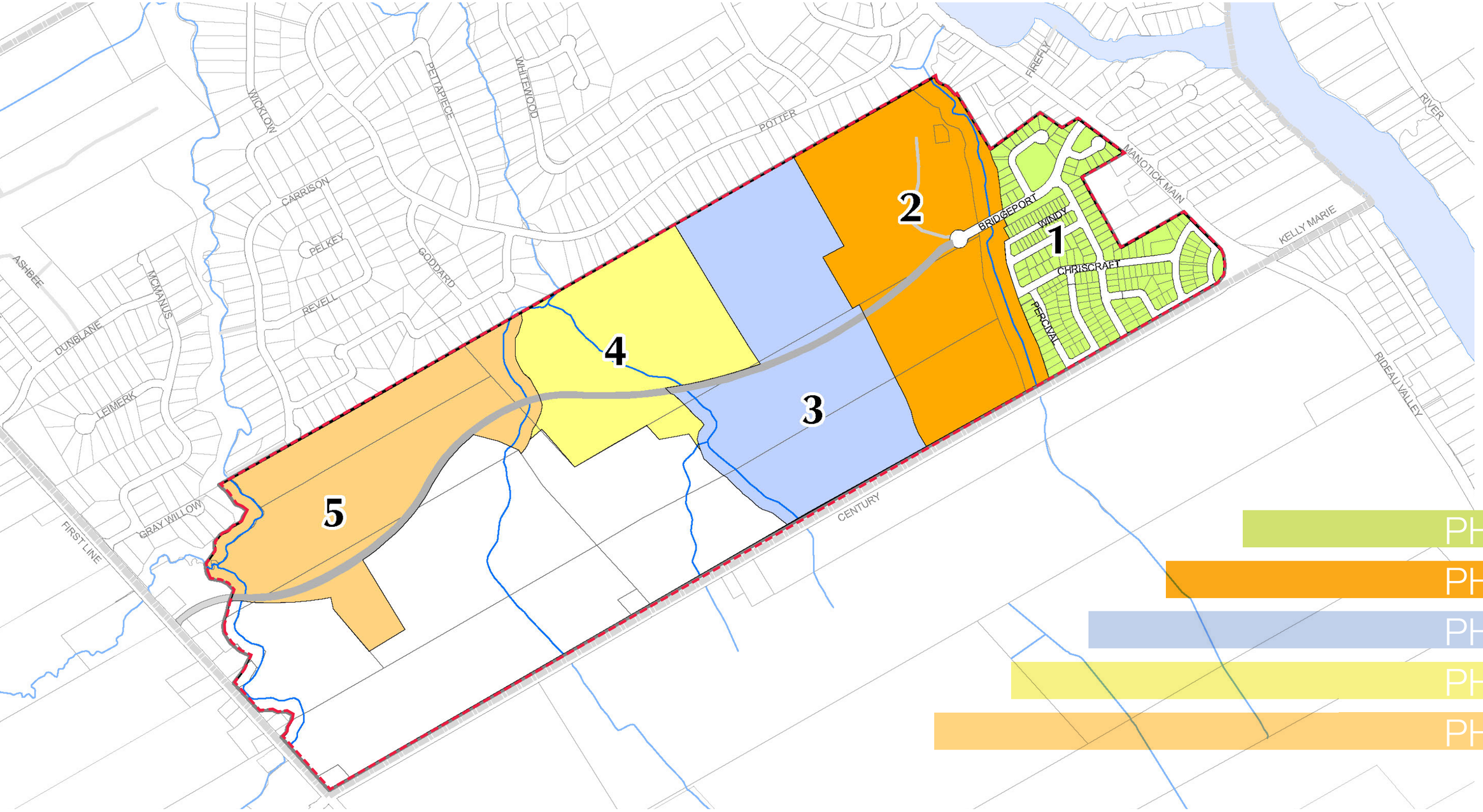
- SINGLE FAMILY **LOW DENSITY**
- SINGLE FAMILY **MODERATE DENSITY**
- **MIXED RESIDENTIAL**
- PARKS & OPEN SPACE
- WATERCOURSE & DEVELOPMENT SETBACK
- NEIGHBOURHOOD AMENITY
- STORMWATER MANAGEMENT POND
- NATURAL ENVIRONMENT AREA
- FUTURE DEVELOPMENT AREA



LAND USE & ASSOCIATED DENSITY REQUIREMENTS

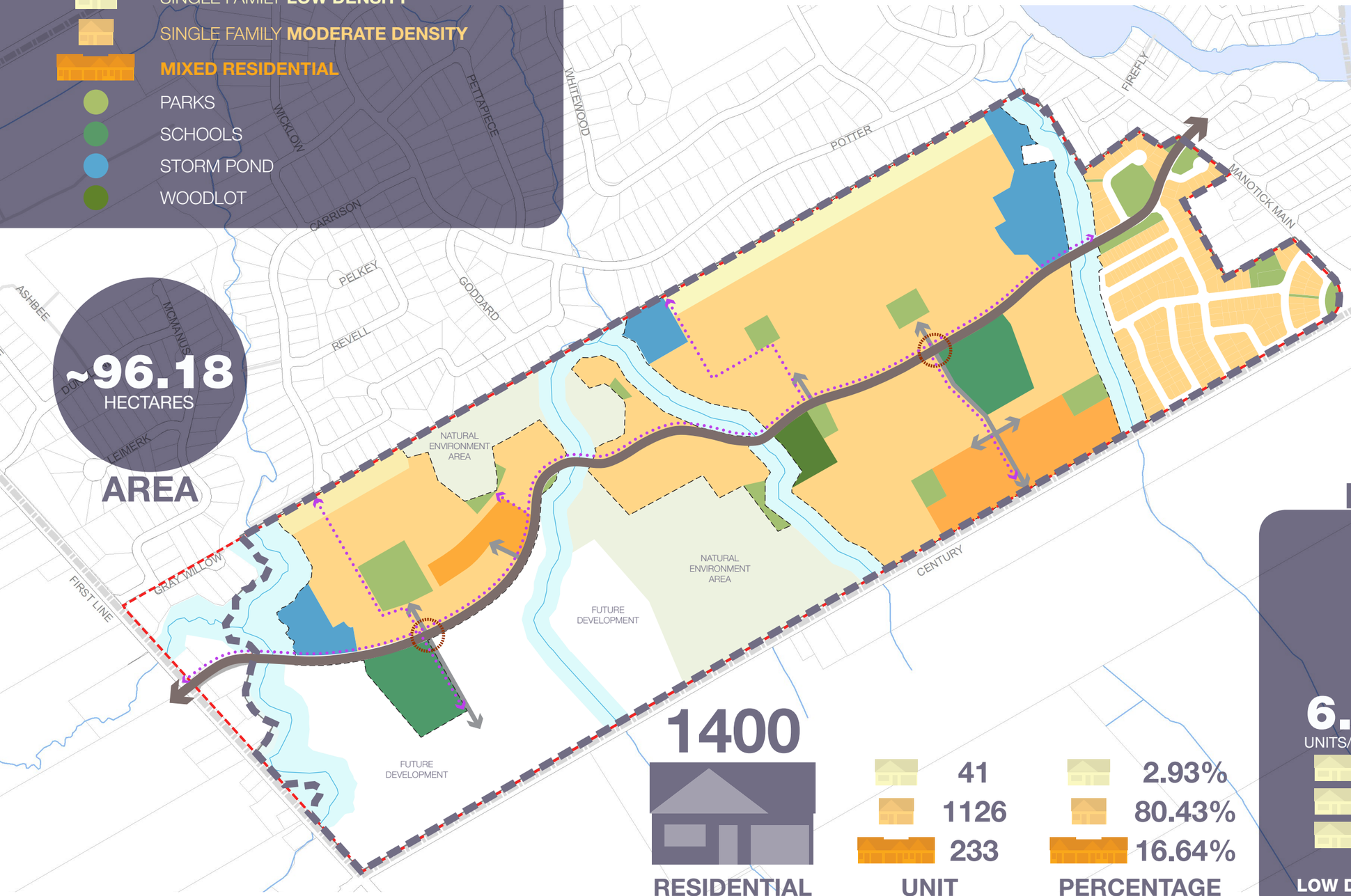
APPROXIMATE LOT SIZE	MAXIMUM	MAXIMUM	25%
22m × 50m	16 UNITS / HA (GROSS RESIDENTIAL AREA)	35 UNITS / HA (GROSS RESIDENTIAL AREA)	TOTAL RESIDENTIAL UNITS
SINGLE FAMILY **LOW DENSITY**	SINGLE FAMILY **MODERATE DENSITY**	**MIXED RESIDENTIAL**	

EXISTING PHASING FOR MAHOGANY COMMUNITY



LEGEND

- SINGLE FAMILY **LOW DENSITY**
- SINGLE FAMILY **MODERATE DENSITY**
- **MIXED RESIDENTIAL**
- PARKS
- SCHOOLS
- STORM POND
- WOODLOT



~96.18
HECTARES

AREA

14.56
UNITS/HECTARE

COMMUNITY DENSITY

DENSITY BREAKDOWN

26.08
UNITS/HECTARE

14.01
UNITS/HECTARE

6.79
UNITS/HECTARE

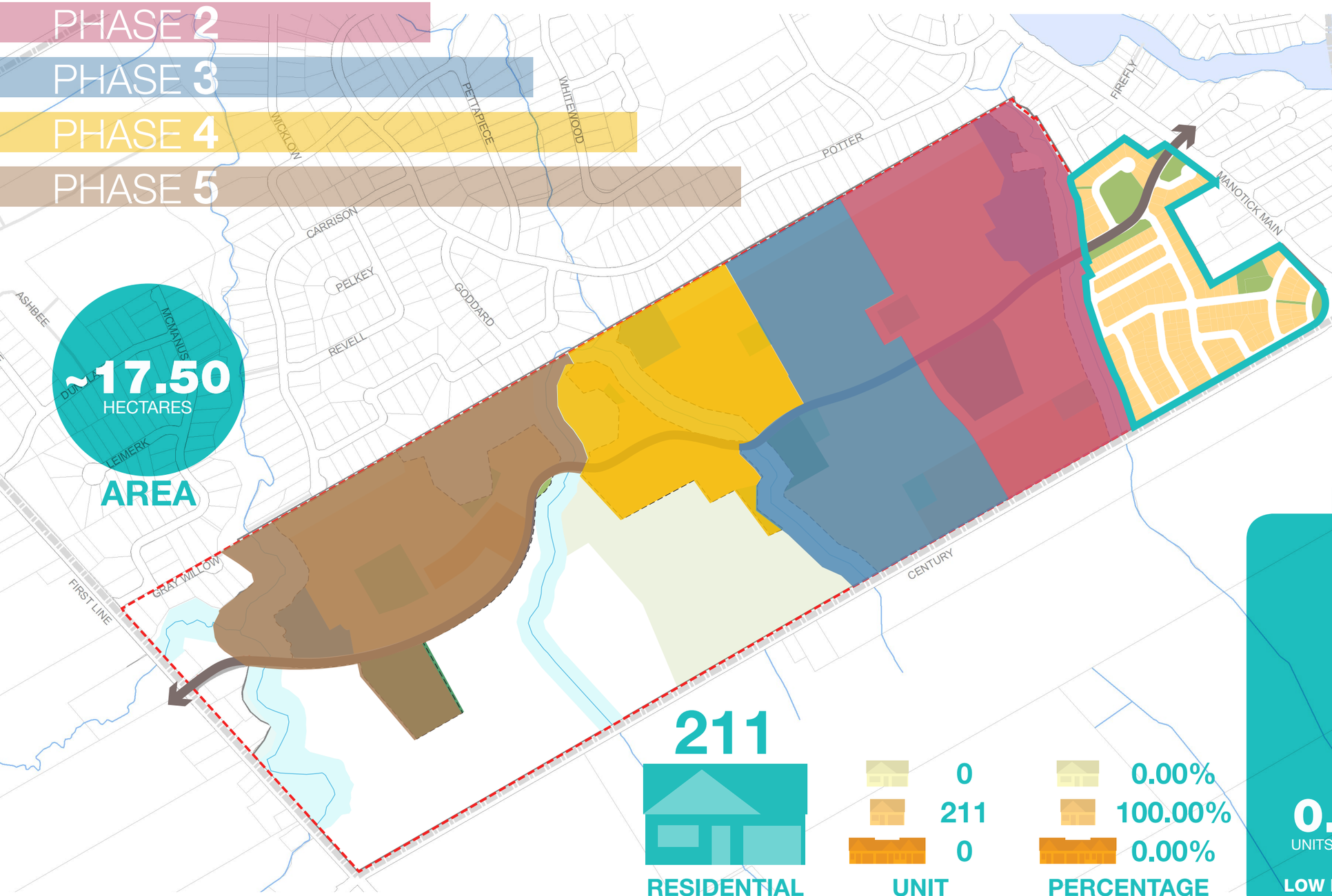
LOW DENSITY	MODERATE DENSITY	MIXED RESIDENTIAL

1400

RESIDENTIAL UNITS

UNIT BREAKDOWN	PERCENTAGE BREAKDOWN
41	2.93%
1126	80.43%
233	16.64%

PHASE 1
PHASE 2
PHASE 3
PHASE 4
PHASE 5



~17.50
HECTARES
AREA

12.06
UNITS/HECTARE
PHASE 1 DENSITY

211
RESIDENTIAL UNITS

UNIT BREAKDOWN	PERCENTAGE BREAKDOWN
0	0.00%
211	100.00%
0	0.00%

DENSITY BREAKDOWN

LOW DENSITY	MODERATE DENSITY	MIXED RESIDENTIAL
0.00 UNITS/HECTARE	12.06 UNITS/HECTARE	0.00 UNITS/HECTARE

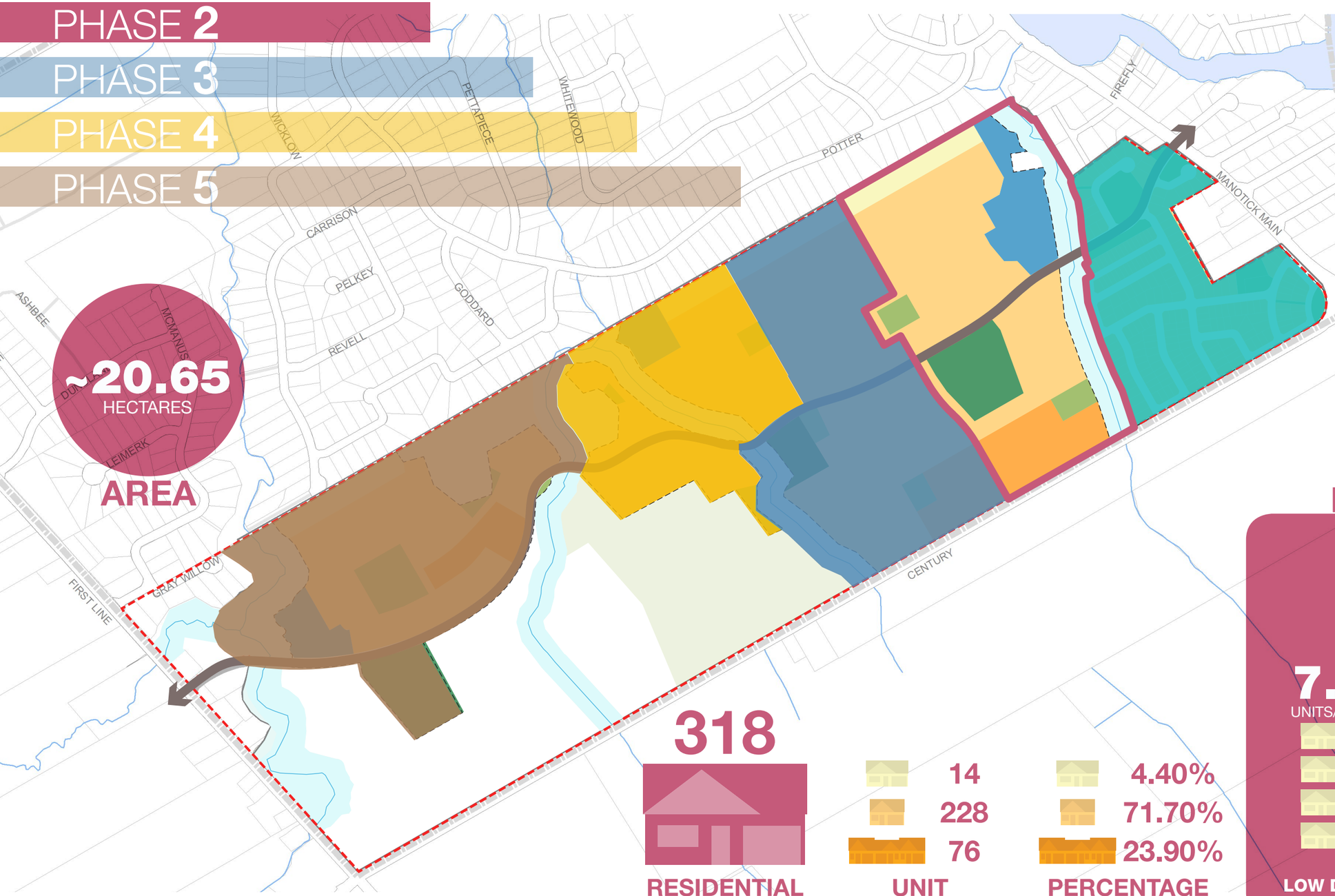
PHASE 1

PHASE 2

PHASE 3

PHASE 4

PHASE 5



~20.65
HECTARES

AREA

15.40
UNITS/HECTARE

PHASE 2 DENSITY

DENSITY BREAKDOWN

318

RESIDENTIAL UNITS

UNIT BREAKDOWN	PERCENTAGE BREAKDOWN
14	4.40%
228	71.70%
76	23.90%

7.07
UNITS/HECTARE

LOW DENSITY

15.09
UNITS/HECTARE

MODERATE DENSITY

21.36
UNITS/HECTARE

MIXED RESIDENTIAL

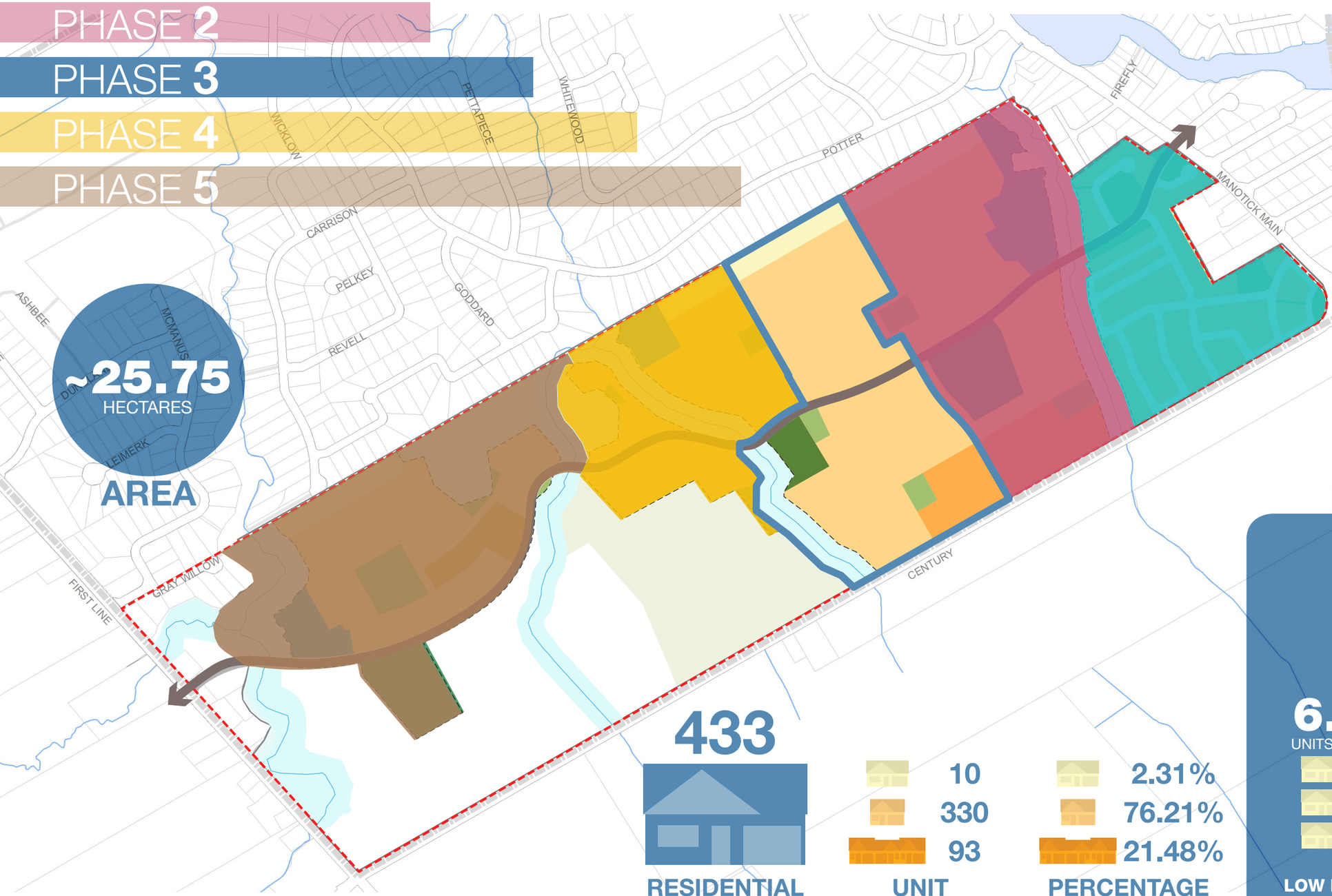
PHASE 1

PHASE 2

PHASE 3

PHASE 4

PHASE 5



~25.75
HECTARES

AREA

16.82
UNITS/HECTARE

PHASE 3
DENSITY

DENSITY BREAKDOWN

31.83
UNITS/HECTARE

15.51
UNITS/HECTARE

6.48
UNITS/HECTARE

LOW DENSITY

MODERATE DENSITY

MIXED RESIDENTIAL

433

RESIDENTIAL UNITS

UNIT BREAKDOWN	PERCENTAGE BREAKDOWN
10	2.31%
330	76.21%
93	21.48%

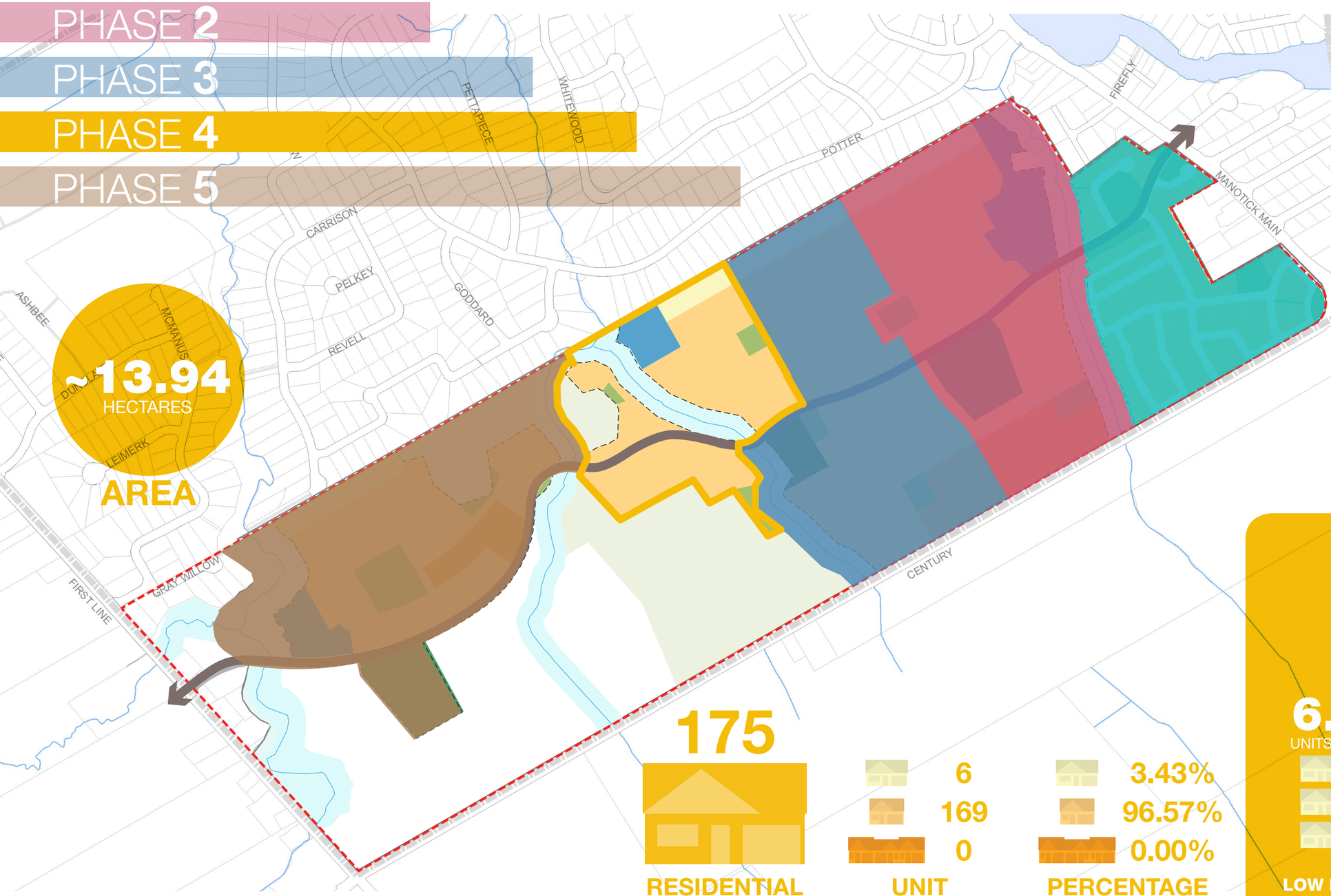
PHASE 1

PHASE 2

PHASE 3

PHASE 4

PHASE 5



~13.94
HECTARES

AREA

12.55
UNITS/HECTARE

PHASE 4 DENSITY

DENSITY BREAKDOWN

175

RESIDENTIAL UNITS

	UNIT BREAKDOWN	PERCENTAGE BREAKDOWN
	6	3.43%
	169	96.57%
	0	0.00%

6.69
UNITS/HECTARE

LOW DENSITY

12.95
UNITS/HECTARE

MODERATE DENSITY

0.00
UNITS/HECTARE

MIXED RESIDENTIAL

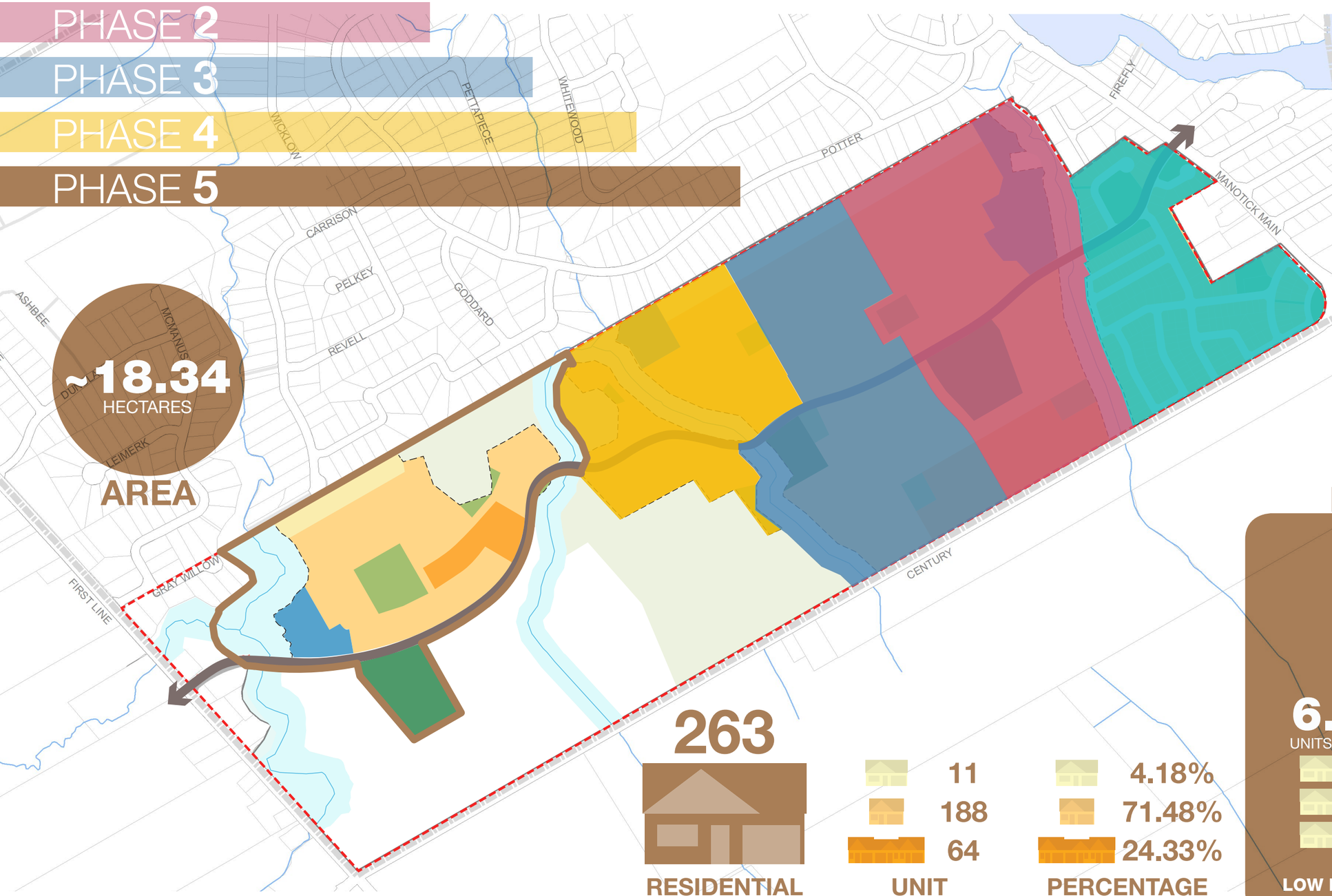
PHASE 1

PHASE 2

PHASE 3

PHASE 4

PHASE 5



~18.34
HECTARES

AREA

14.34
UNITS/HECTARE

PHASE 5
DENSITY

263

RESIDENTIAL
UNITS

11	4.18%
188	71.48%
64	24.33%
UNIT BREAKDOWN	PERCENTAGE BREAKDOWN

DENSITY BREAKDOWN

LOW DENSITY	MODERATE DENSITY	MIXED RESIDENTIAL
6.41 UNITS/HECTARE	13.47 UNITS/HECTARE	23.98 UNITS/HECTARE