

Torbay Developable Public Land Inventory and Residential Suitability Analysis

Prepared for:

Town of Torbay



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1. Introduction and Executive Summary

This project, focusing on developable public land and residential housing suitability, is a component of the Town of Torbay's Housing Action Plan (Town of Torbay, 2024a) and is supported by the Government of Canada, administered by Canada Mortgage and Housing Corporation. The analysis input and outputs are spatially explicit (mapped), and project components include:

- Delineation of public versus private land, insofar as this is possible given the available information, and time and budget limitations.
- Identification of hard constraints, which are areas excluded from residential suitability consideration.
- Scoring of relative suitability of land for new residential development using spatial multi-criteria evaluation.
- Neighbourhood socioeconomic summaries based on Statistic Canada's (StatCan's) dissemination areas, with data from the 2021 short- and long-form census.
- Suitable areas/sites assessment examples, summarizing key considerations for selected parcels of confirmed and assumed public land.

Due to the lack of requirement in the Province of Newfoundland and Labrador to register land title deeds a definitive delineation of public land is not possible, but the thorough investigative gap-filling process used in this project has resulted in improved land ownership information for the purposes of municipal planning by the Town (see Figure 1).

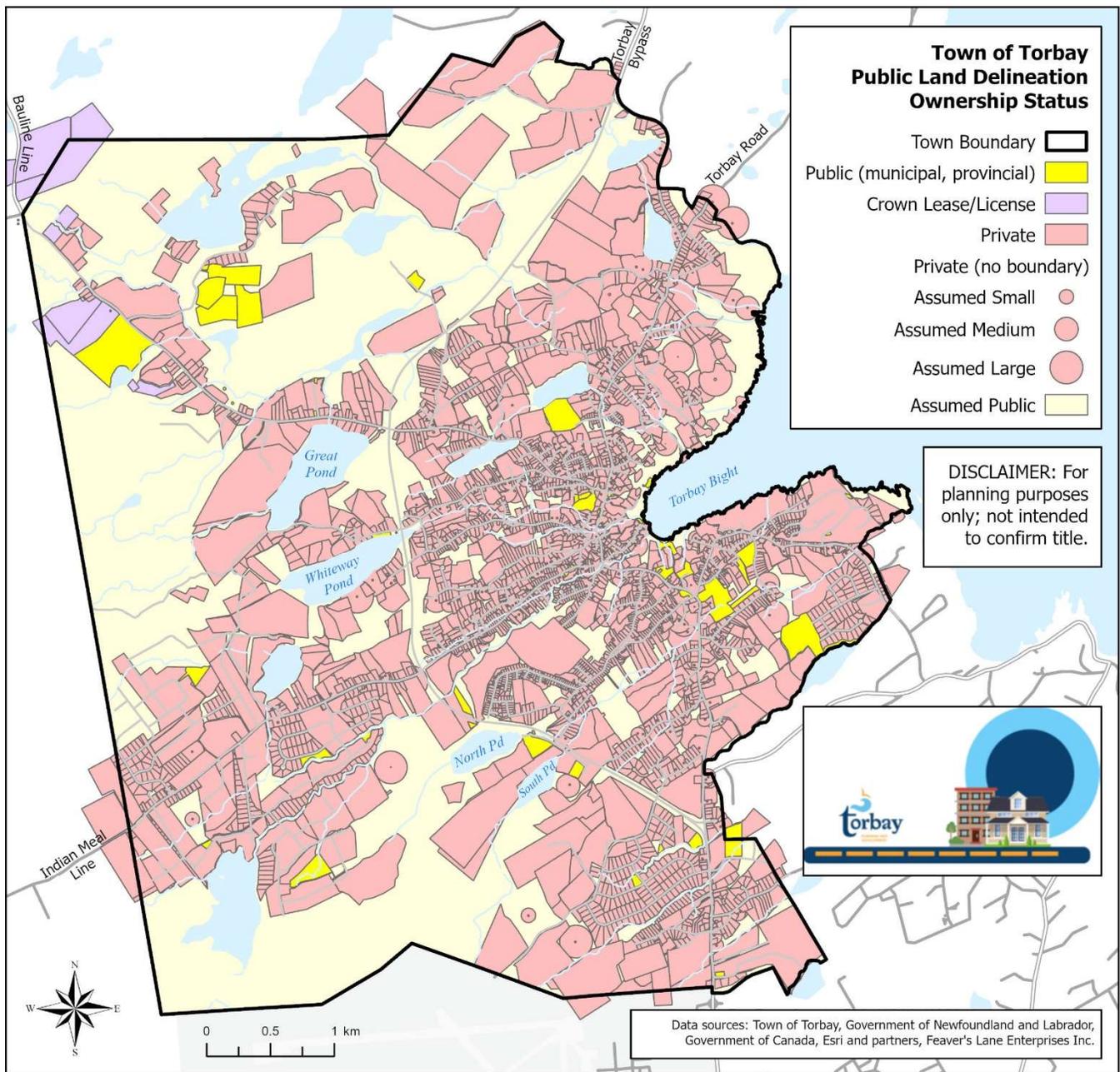


Figure 1 – Map of Land Ownership Status

Note that the mapped ownership status delineations are not intended to confirm title.

Areas constrained/excluded from residential suitability analysis cover important natural features and industrial activities whose importance, protection status and/or zoning make them unlikely and unwise residential development candidates (see the black constraints exclusion mask in Figure 2).

Suitability analysis incorporates accessibility, additional natural features, services and zoning, and several scenarios combining the chosen criteria into overall scores have been provided for consideration. The overall score mapped in the example in Figure 2 is out of 100, where darker shades of pink/purple indicate greater suitability. Many of the suitability

criteria are available as high-resolution spatial data (e.g., slope derived from 1 metre elevation data), so the results are very granular but can be summarized (e.g., an average suitability score calculated) for areas/sites of interest.

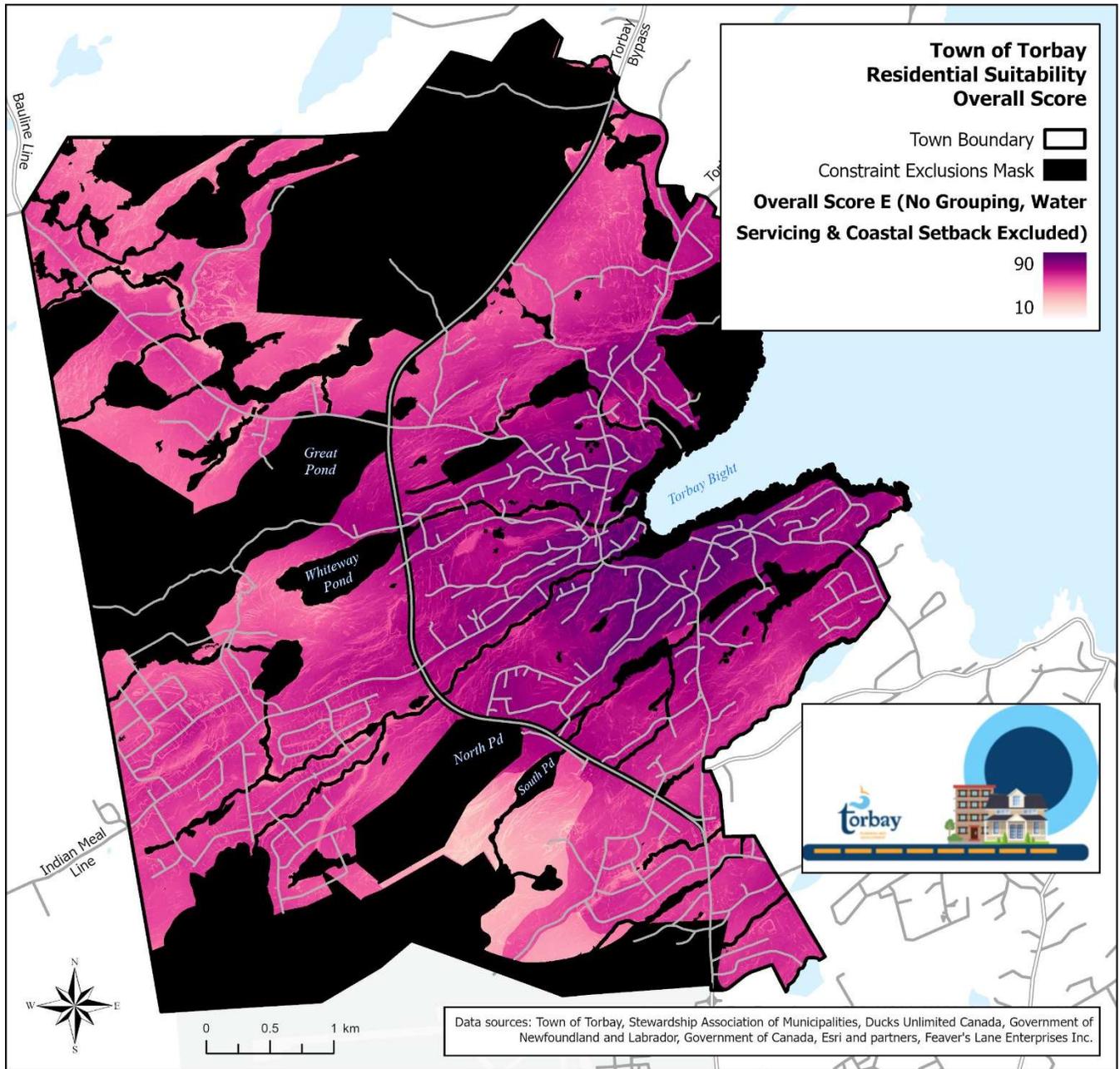


Figure 2 – Map of Overall Residential Suitability (Scenario E – see the Weighted Sum Scenario Outputs section below for details)

Interesting information from the socioeconomic summaries includes the diversity of dwelling and household types, language and ethnicity across neighbourhoods, as well as identification of neighbourhoods where aging-in-place strategies could be more helpful.

Selection of suitable sites/areas for assessment using the developed template was especially challenging given uncertainty in the public land delineation, and they represent examples only.

The analysis components are intentionally independent but can be used in combination when appropriate. For example, excluded areas from the constraints step have been used as a mask in mapping suitability criteria and scenarios (see the black areas in Figure 2 above and more detail on these excluded areas in Figure 5 below), and to limit the areas/sites considered for assessment at this time. But the suitability analysis has been performed town-wide (i.e., applied to all types of land).

The Town has been provided with the analysis inputs and outputs, including databases in geographic information system (GIS) format, as well as method details, to facilitate:

- Updating the delineations and analyses as new information becomes available.
- Running additional suitability scenarios based on alternative criteria and weighting.
- Applying the suitable areas assessment to other areas, including proposed private land developments.

1.1. Key Conclusions

Key conclusions are that there is limited public land available for development in the Town of Torbay (see Figure 1), and that some of the assumed public land (based on available information) may prove to be private. The legal land title process, common to all land transactions in Newfoundland and Labrador, should be invoked to confirm the status of areas of interest assumed to be public. Another clear result is that the most suitable areas for development are in the heart of Town around Torbay Bight. Much of this area has already been developed or is constrained from residential development. Densification of this part of Town, including alternative dwelling types, should be strongly considered.

For another summary based on earlier draft results, please see Electronic Appendix A – December 2025 PowerPoint Presentation to Council. Note that some of the maps are different between the draft results in the December presentation and this final report.

2. Public Land Delineation

2.1. Scope and Objective

A key project goal is to produce a single, Town-wide polygon dataset classifying land as Public or Private, with further attribution of ownership type and confidence. When combined with the other analyses in this report, the dataset will support up-front screening for residential development and related activities. It is not intended to replace legal parcel definitions or formal title determination.

Each Ownership Status polygon contains these key attributes:

- Ownership
- Source
- Confidence (High, Moderate, Low)
- Notes

The full data schema is available in Appendix B – Public Land Data Management.

The extent of this analysis is the Town of Torbay municipal boundary. The Ownership Status polygons are projected using Government of Newfoundland and Labrador Modified Transverse Mercator Zone 1 based on the NAD83 (CSRS) datum. This metadata is also embedded within the polygon dataset provided to the Town.

2.2. Data Sources

Multiple provincial, municipal, and federal datasets were reviewed and integrated due to the absence of a single authoritative parcel layer for all public and private lands. Key sources include:

- Town of Torbay parcel and assessment data.
- Provincial Crown Lands Registry and Crown Titles records (Government of Newfoundland and Labrador, 2025a).
- Provincial Land Use Atlas (Government of Newfoundland and Labrador, 2025b).
- Canada Lands Survey System (Natural Resources Canada, 2025a).
- Provincial Company and Deeds Online (CADO) search, for confirmatory use only (<https://cado.eservices.gov.nl.ca/>).

No federal lands, national parks or protected areas were identified within Torbay through federal datasets.

2.3. Classification Strategy

As introduced above, the classification strategy was designed to support screening for likely public and private lands using the best available municipal and provincial information. Unlike jurisdictions with comprehensive cadastral systems, Newfoundland and Labrador does not have a single, authoritative, province-wide parcel dataset, and land ownership is established primarily through survey plans and legal instruments rather than an integrated parcel mapping system.

As a result, ownership information is distributed across Crown Lands records, assessment rolls, historic surveys, and deed registries, each with varying spatial precision and completeness. Given these constraints, land classification relies on interpreting multiple data sources with differing levels of certainty, particularly Crown Lands records. Where ownership could not be resolved with sufficient confidence, lands were retained as a separate Uncertain category to clearly flag areas requiring further review.

Lands within the study area were categorized based on the best available ownership information:

- Public (municipal) – confirmed as municipally owned based on Town of Torbay property data and the municipal assessment roll. Not all municipally owned lands are spatially mapped in existing parcel datasets.
- Public (provincial) – confirmed as provincially owned based on Town of Torbay property data and the assessment roll. Not all provincially owned lands are spatially mapped in existing parcel datasets.
- Private – confirmed as privately owned through Town of Torbay parcel data and Crown Land Grants not identified as public (leases, licences, quieting of titles and quit claims). Crown Grants are assumed to represent private ownership, recognizing that subsequent sales are not tracked in provincial Crown Lands records.
- Crown Lease/License – Crown Lands records with unresolved or temporary tenure status. These areas were retained as a separate category due to uncertainty in ownership or tenure permanence.

Crown Lands records represent tenure and title history, not a current ownership map. In particular:

- Crown Grants show the original transfer from the Crown and do not track subsequent private sales.
- Many Crown records lack complete spatial boundaries or current ownership status.

Crown title types and other source data were interpreted as outlined in Figure 3. Additional helpful notes and historical context are provided in Appendix B – Public Land Data Management.

Source	Ownership Type	Confidence	Rationale	Data Layer	Note
Town Parcel Layer	Public	High	Mapped municipal parcel with assessment and town ownership records	Public	May have ongoing use such as Town Hall
Town Parcel Layer	Private	High	Mapped municipal parcel with assessment and town ownership records	Private	
Issued – Transfer	Private	High	A registered transfer indicates a formal conveyance of interest and is typically associated with private ownership	Private	
Misc. Crown Land	Public	Moderate	Labeled as Crown land but lacks a specific grant, lease, license, or formal designation	Public	Only 1 polygon
Quieting of title	Private	Moderate	References indicate an attempt to resolve competing claims but do not guarantee clear title or confirmed ownership	Private	We only kept those with no overlapping town parcel info
Quit Claims			See glossary of terms in Appendix B – Public Land Data Management.		All quit claims have overlapping town parcel data
Issued – Grants	Private	Moderate	A Crown Grant indicates land was conveyed from the Crown, but subsequent ownership changes are not tracked in Crown records	Private	
Issued – Permission	Public	Low	Permissions do not create a private land interest, only temporary allowance	Crown Lease/License	
Issued – Lease	Private	Low	A lease provides exclusive use rights to a private party, although underlying ownership remains public and terms may be conditional or time-limited	Crown Lease/License	Potential ongoing private use
Issued – License	Private	Low	A license authorizes use but does not convey ownership or exclusive tenure and may be revoked	Crown Lease/License	
Orders in Council	Private or Public	low	Orders in Council authorize or approve land actions but do not, on their own, confirm that ownership	Crown Lease/License	Only 1 polygon but removed as it was a small linear parcel
No identified ownership record	Public	Low	No town parcel, Crown grant, lease, license, or registered private interest was identified after reasonable review of available records	Assumed Public	Classified for screening only; ownership not confirmed.

Figure 3 – Source Data Interpretation

In summary, the strategy focused on improving the completeness and confidence of the Public vs. Private land classification by targeting gaps and areas of uncertainty in existing ownership data. Municipal and provincial properties that were not previously mapped have been added where reasonable spatial inference could be made. In cases where parcels were not identifiable through CADO, but neighbouring parcels had civic numbers or clear spatial context, placeholder polygons were introduced (small circles in Figure 4, as per Town mapping standards).

Crown Land Grants were reviewed to identify any parcels that may be municipally owned but not explicitly captured in available parcel datasets. In parallel, areas flagged as Crown Lease/License or Quit Claim within the Crown Lands data were examined to better understand their ownership status and to determine whether they should be reassigned based on supporting evidence.

The results of this effort are mapped in Figure 4, where all land without any spatial information regarding its delineation was assumed to be public.

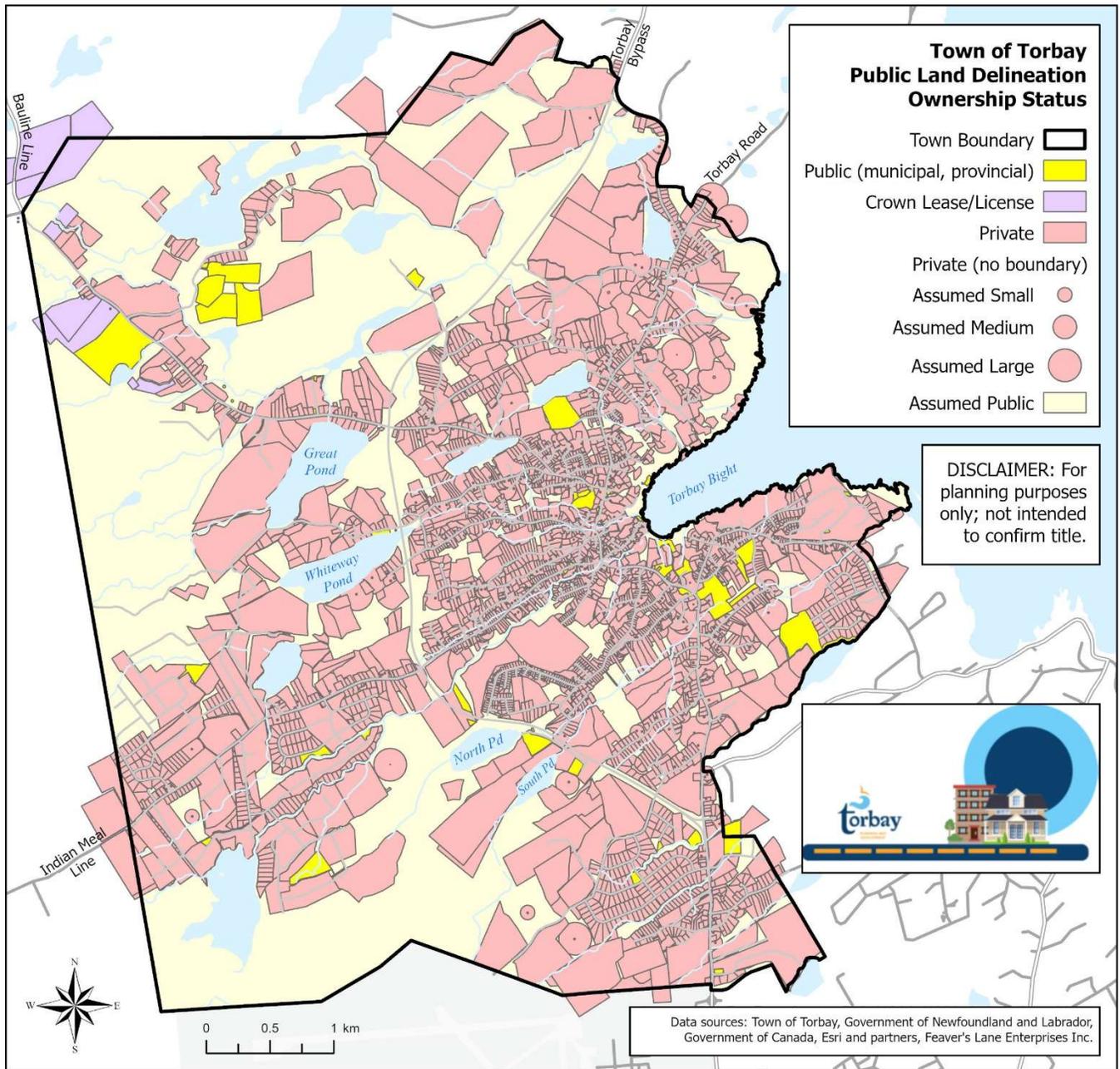


Figure 4 – Map of Land Ownership Status

The workflow included targeted investigation of higher-suitability areas that currently have no associated ownership polygons. These areas were used as a screening mechanism to prioritize ownership research. For each high-suitability area, available evidence of private ownership was reviewed, including the data sources described above and indicators of human use visible in aerial imagery. If an area is clearly privately owned (e.g., listed in the Town assessment roll) but no boundary information (e.g., via survey or Crown Lands) was available, a circular symbol with size reflecting the assumed size of the parcel has been used in Figure 1 and labeled Private (no boundary) in the legend. Where no clear indicators of private ownership were found, further investigation could be undertaken by the Town as

needed. Candidates for development could be assessed using the process outlined below in Areas/Sites Assessment Examples.

2.4. Known Data Gaps and Challenges

CADO Deeds Search was used as a supporting and confirmatory tool only, and not as a primary source for ownership determination, due to the following limitations:

- The system does not support parcel identifiers (PIDs) or spatial search and provides no map-based context.
- Location and community fields rely on inconsistent free-text descriptions, resulting in variable and often ambiguous search results.
- Search results return registered instruments (e.g., mortgages, agreements, conveyances, easements), rather than definitive ownership records.
- Many municipal and provincial lands were never registered through standard deed instruments and are therefore absent from Deeds Search.

As a result, CADO Deeds Search provides moderate confidence at best and is unsuitable for identifying unmapped, vacant, or legacy public lands.

Several broader data gaps and challenges affect the completeness and certainty of the Public vs. Private Lands dataset:

- Provincial Crown Lands data documents original title issuance but does not reflect subsequent private sales or transfers, limiting its reliability for current ownership.
- Many public lands lack civic addresses, formal surveys, or parcel identifiers, complicating spatial verification.
- Supreme Court references, historic Crown records, and legal documents require manual interpretation and cannot be reliably automated.
- Placeholder polygons are used where survey evidence is likely to exist, but spatial documentation is incomplete or the survey is unavailable.

The Town is encouraged to continue filling information gaps. Appendix B – Public Land Data Management and outputs in GIS format have been provided to support that effort.

3. Constraints Analysis

The constraints that are being used as a mapping mask in the suitability analysis and to limit the identification of areas/sites for detailed assessment are listed in Appendix C – Constraints Table, including notes and data sources. In summary, they are:

- Natural Features
 - Waterbodies larger than 1ha (10,000m²) (Natural Resources Canada, 2025b).
 - Wetlands. Note that the Town is in the process of refining its Wetland delineation under the Natural Assets components of a climate change vulnerability and

- adaptation project with partners Fundamental Inc. (<https://fundamentalinc.ca/>), Feaver's Lane (<https://feaverslane.com>) and Aquatic Conservation Initiative (<https://aci-nl.ca/>). The data used is a combination of interim results from that process including recent work by Ducks Unlimited Canada (<https://www.ducks.ca/>) and the Stewardship Association of Municipalities (SAM, <https://www.samnl.org/>), and supplemented with coarser saturated soils data from the historical 1:50,000 national topographic maps (Natural Resources Canada, 2025b).
- Conservation areas under SAM stewardship agreements.
 - Drinking water protected watersheds (Government of Newfoundland and Labrador, 2025c).
 - Conservation land use zones under the Town's zoning by-laws.
 - Provincial domestic firewood cutting areas (Government of Newfoundland and Labrador, 2025b).
 - Industrial Features
 - Highway reserve for Kevin Parsons Highway (Torbay Bypass) under the Town's zoning by-laws.
 - Provincial agriculture development areas (ADAs, Government of Newfoundland and Labrador, 2025b).
 - Airport proximity noise, represented as NEF (Noise Exposure Forecast) level 35 (WSP, 2017).

These exclusions are mapped in Figure 5. The order that the data layers are shown in the Legend reflects their drawing order (i.e., layers closer to the top, like wetlands, may be covering up portions of other layers, like watershed zones, that are underneath).

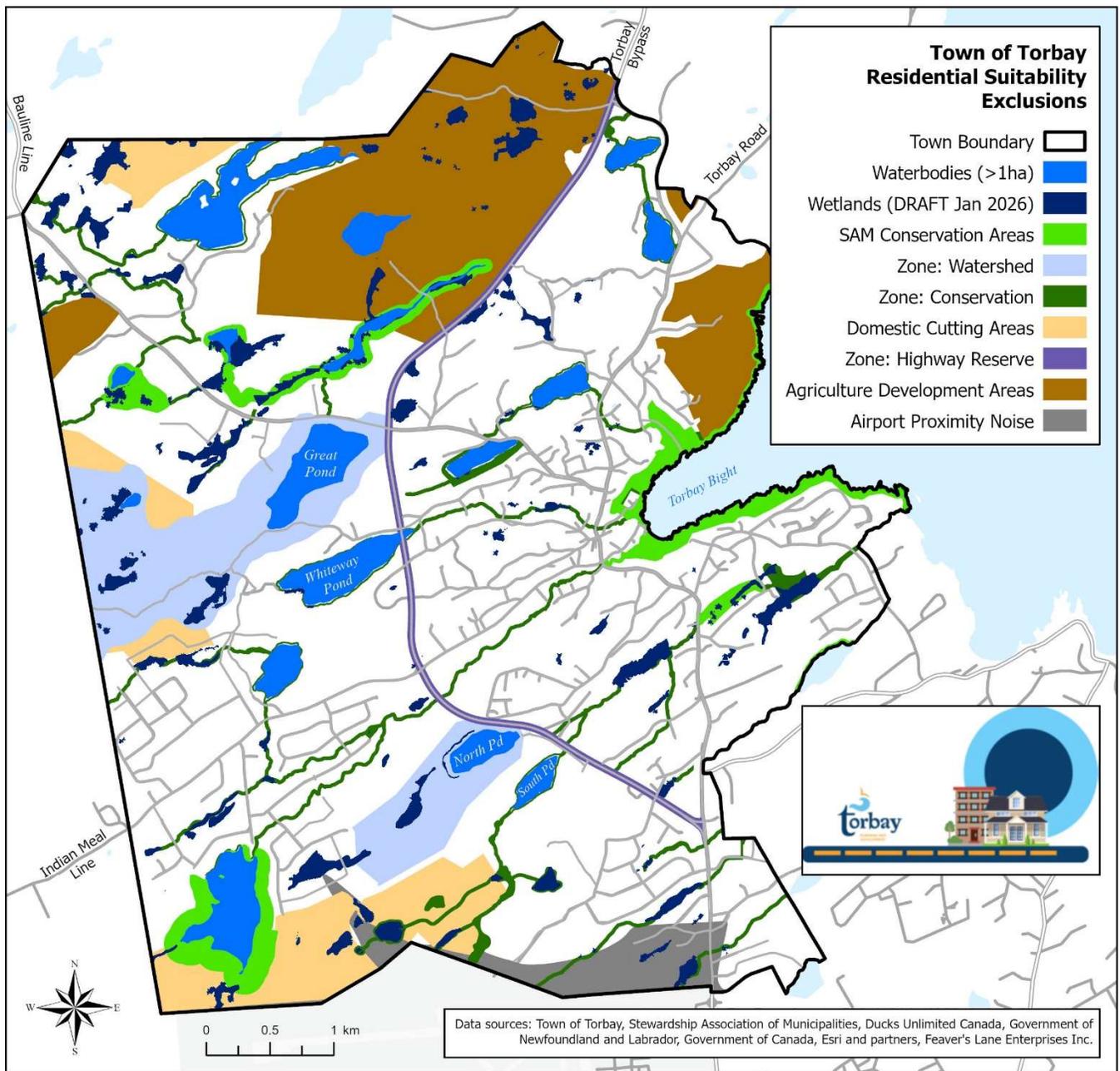


Figure 5 – Map of Constraints/Exclusions

After combining the mapped constraints, it was necessary to clean up small remaining isolated areas, primarily around waterbodies and partially due to low precision in the digitizing of some input data layers. A couple of long and very narrow slivers, along the Town boundary or where two constraint layers did not quite meet, were also removed from the final constraint exclusions mask (shown in Figure 6).

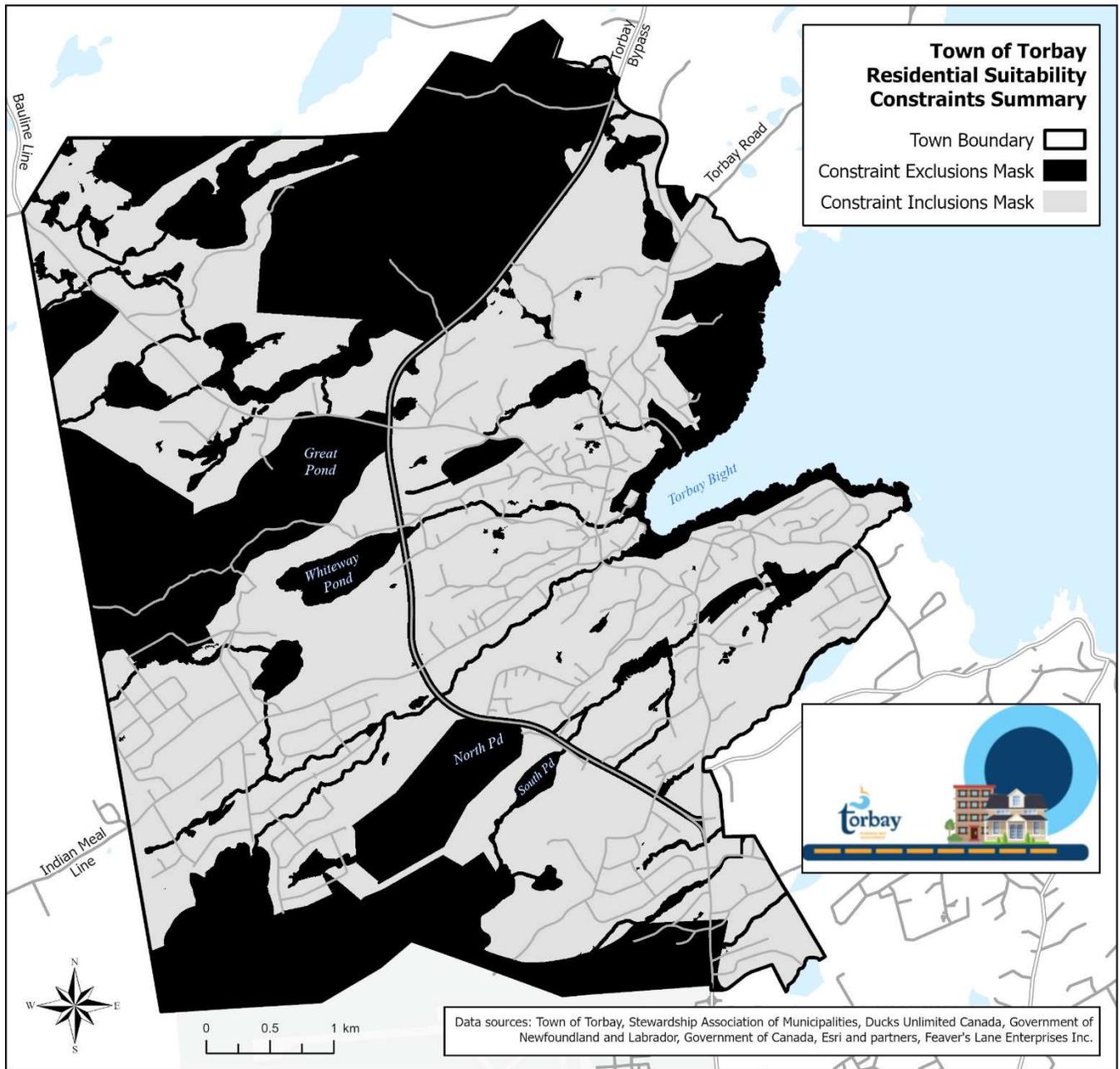


Figure 6 – Summary Map of Combined Exclusions

4. Residential Development Suitability Analysis

Multi-criteria analysis, as a scientific approach, can be applied to all types of decision-making processes, from purchase decisions to staff hiring. The spatial adaptation of multi-criteria analysis relies on bringing the mapped data representing each criterion to a common spatial reference (in our case a one-metre grid covering the Town). Figure 7 shows a simple example of five layers that describe a property. Each grid cell for each data layer has an appropriate value for that layer at that location. For example, the elevation layer has higher

cell values for higher elevations. Visualizing the layers together and/or combining them is referred to as overlay.

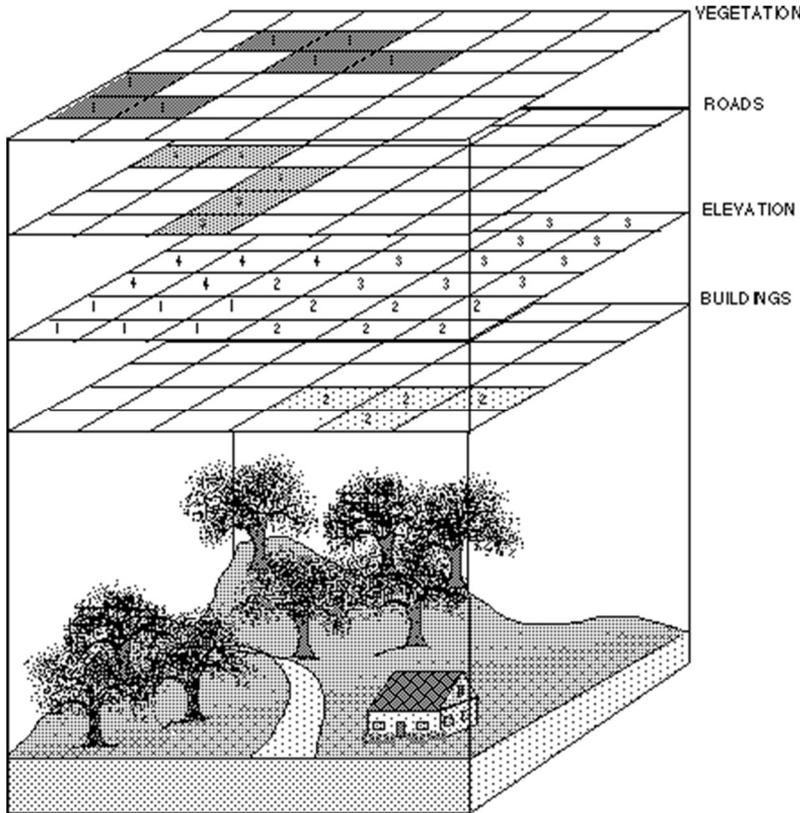


Figure 7 – Spatial Overlay Example

For the cells for each location, the weighted sum operation performs a calculation of the form:

$$\begin{aligned} \text{Overall Score} = & \\ & (\text{Layer1 Normalized Score} \times \text{Layer1 Weight}) + \\ & (\text{Layer2 Normalized Score} \times \text{Layer2 Weight}) + \\ & \dots \end{aligned}$$

Spatial multi-criteria overlay was used as the suitability analysis technique and involved:

- Assembling data layers that describe the factors of interest, including running spatial analysis (also called geoprocessing) if necessary.
- Normalizing those layers to a common scoring scale (in this case zero to 100, where zero is “totally unsuitable”, one to 99 are levels of increasing suitability, and 100 is “perfectly suitable” with regards to that criterion).
- Running scenarios using weighted sum to combine the layers into a single overall score. In a simple example with two layers, equal weighting would be achieved using $(\text{Layer1 Score} \times 0.5) + (\text{Layer2 Score} \times 0.5)$. To give the second layer three times as much weight we would use $(\text{Layer1 Score} \times 0.25) + (\text{Layer2 Score} \times 0.75)$.

- Ensuring that the weights (0.5 + 0.5 or 0.25 + 0.75 in the simple example above) sum to one so that the zero to 100 scoring system described in the previous bullet also applies to the outputs; in other words, an overall score of 100 is “perfectly suitable” on all criteria according to that model.

It is important to note that multi-criteria analysis is intended as a decision support tool only. Ultimately, people with appropriate authority make, and must take responsibility for, decisions.

4.1. Input Criteria

After several rounds of investigation and discussions with Town staff, a set of criteria that inform residential development suitability have been selected. As this is a spatial analysis, it is essential that reliable mapped data is available for any selected criterion.

Appendix D – Suitability Criteria Table details the selected criteria, including information on the source data and how it has been normalized into scores in the zero to 100 range. The following series of maps show each criterion, with their normalized scores symbolized so that darker colours highlight more suitable areas:

- Accessibility
 - Proximity to roads in Figure 8 (data provided by Town staff with recent additions digitized based on 2025 imagery from <https://www.eagleview.com/>)
 - Flatness in Figure 9 (Natural Resources Canada, 2025c)
- Natural features
 - Distance from wetlands in Figure 10 (wetlands data is described in Constraints Analysis above)
 - Coastal setback in Figure 11 (based on the marine portion of the Town boundary)
 - Flood avoidance in Figure 12 (Natural Resources Canada, 2025d; Progressive Engineering, 2019)
- Services
 - Proximity to water servicing in Figure 13 (from Town as-built data)
 - Proximity to sewer servicing in Figure 14 (from Town as-built data)
 - Proximity to amenities in Figure 15 (digitized from Town tourism map and Google Maps)
- Zoning
 - Non-industrial zoning in Figure 16 (from Town land use zones)

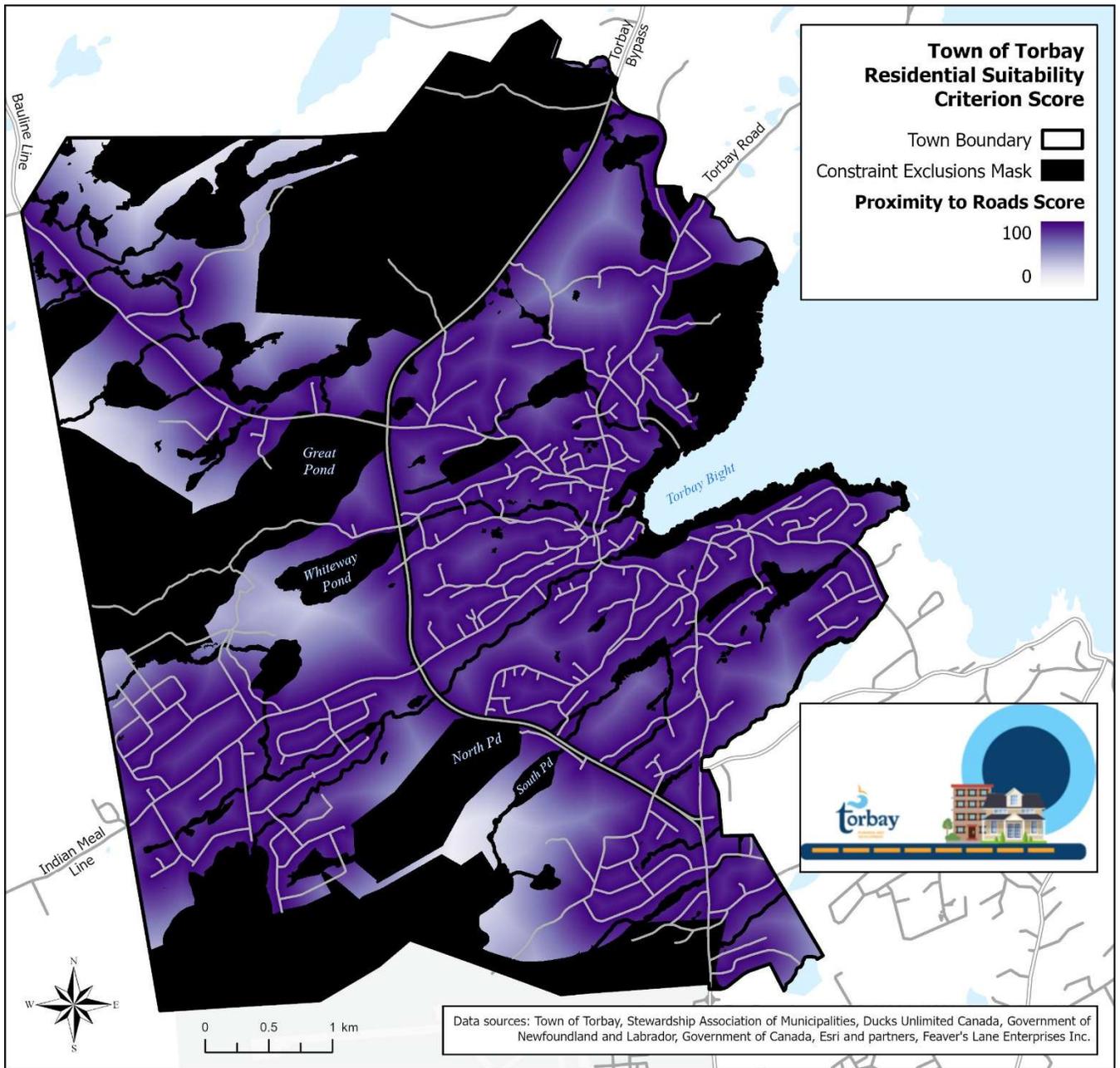


Figure 8 – Map of Proximity to Roads Score

Note that proximity to unpaved roads was given half the score of proximity to paved roads.

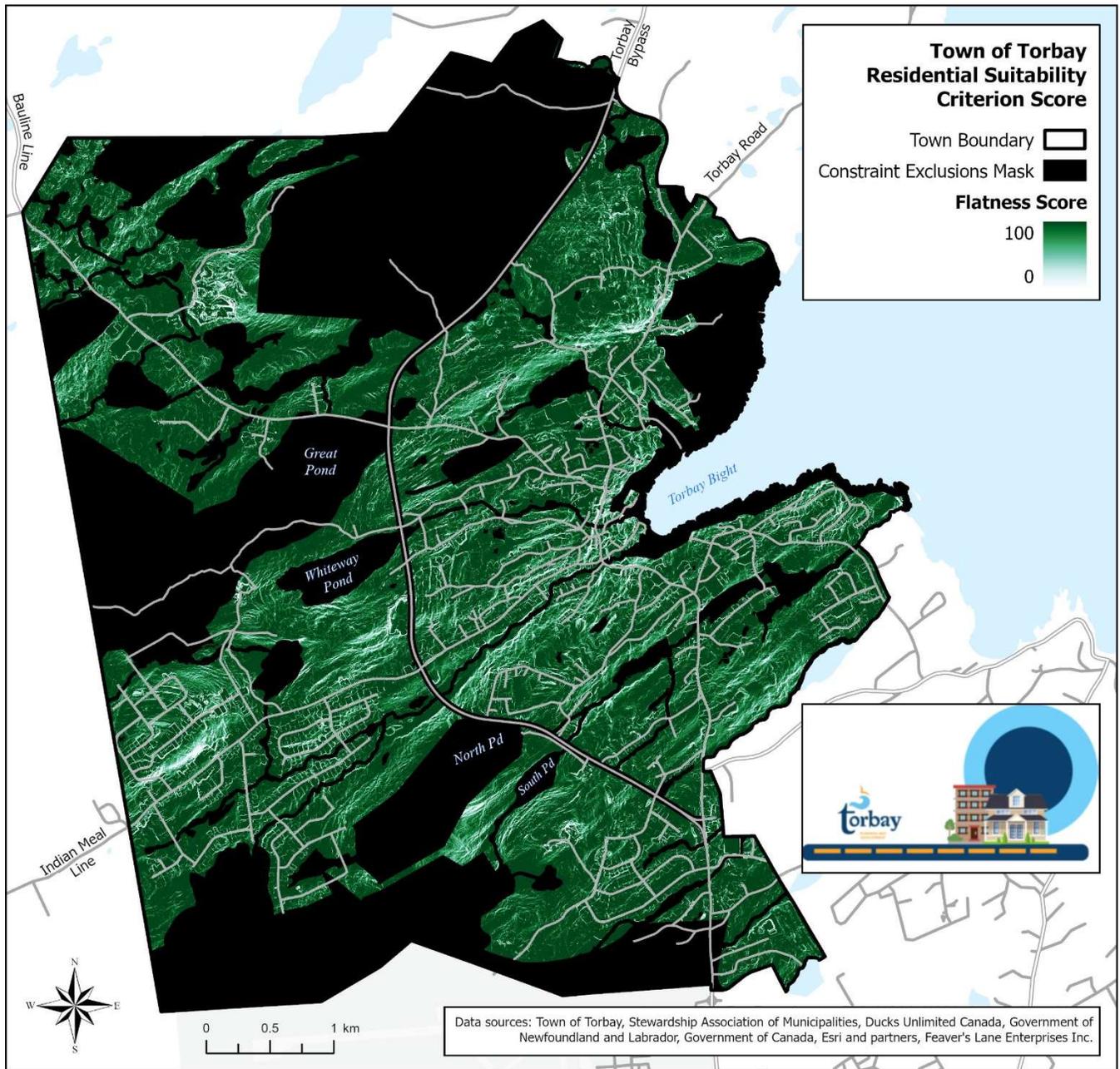


Figure 9 – Map of Flatness Score

Note that greater than 25% slope was scored as zero, between 5% and 25% slope was scored using a linear progression from 100 down zero, and less than 5% slope was scored as 100.

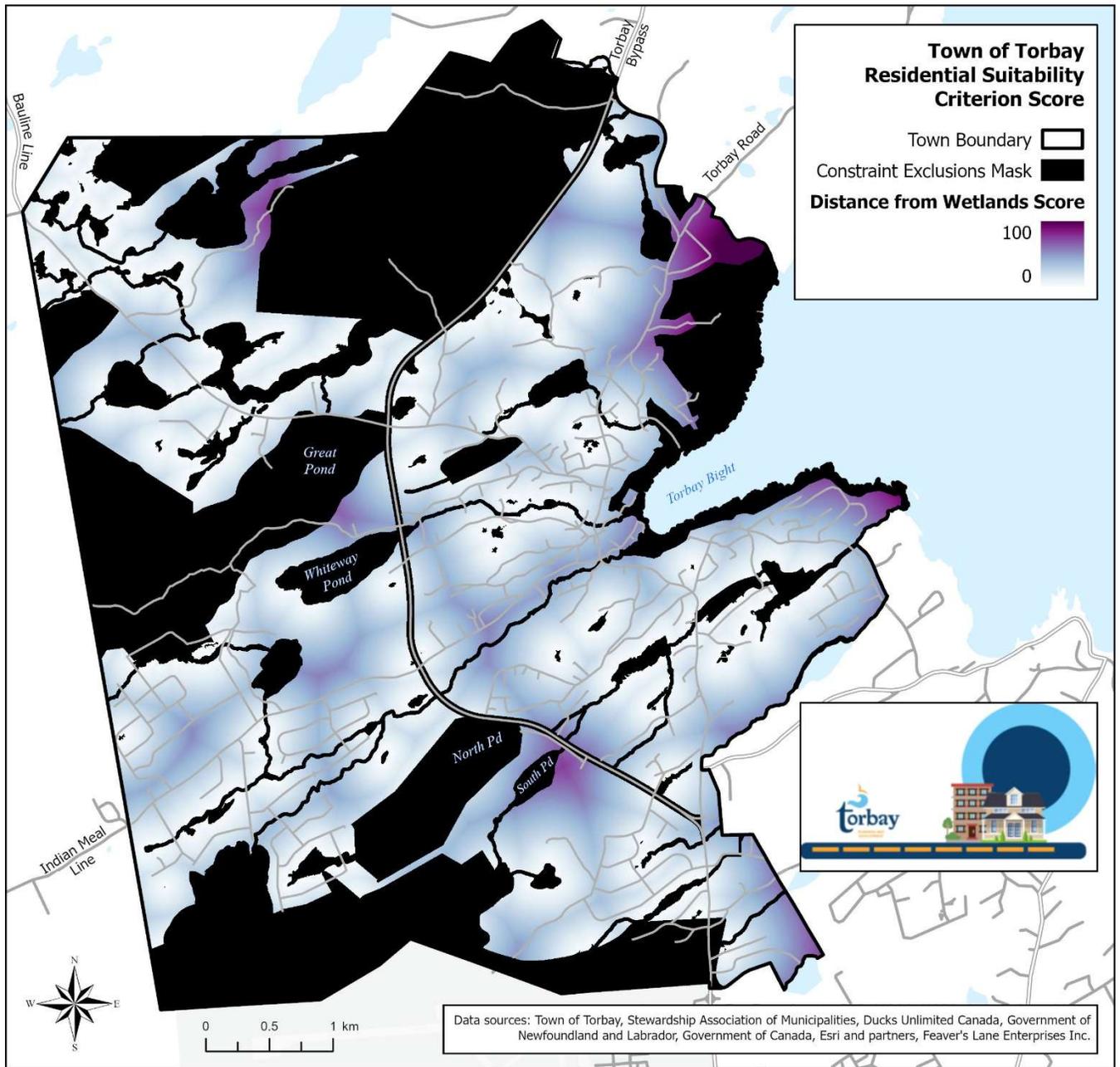


Figure 10 – Map of Distance from Wetlands Score

Note that refined wetlands delineation is a work-in-progress through another project.

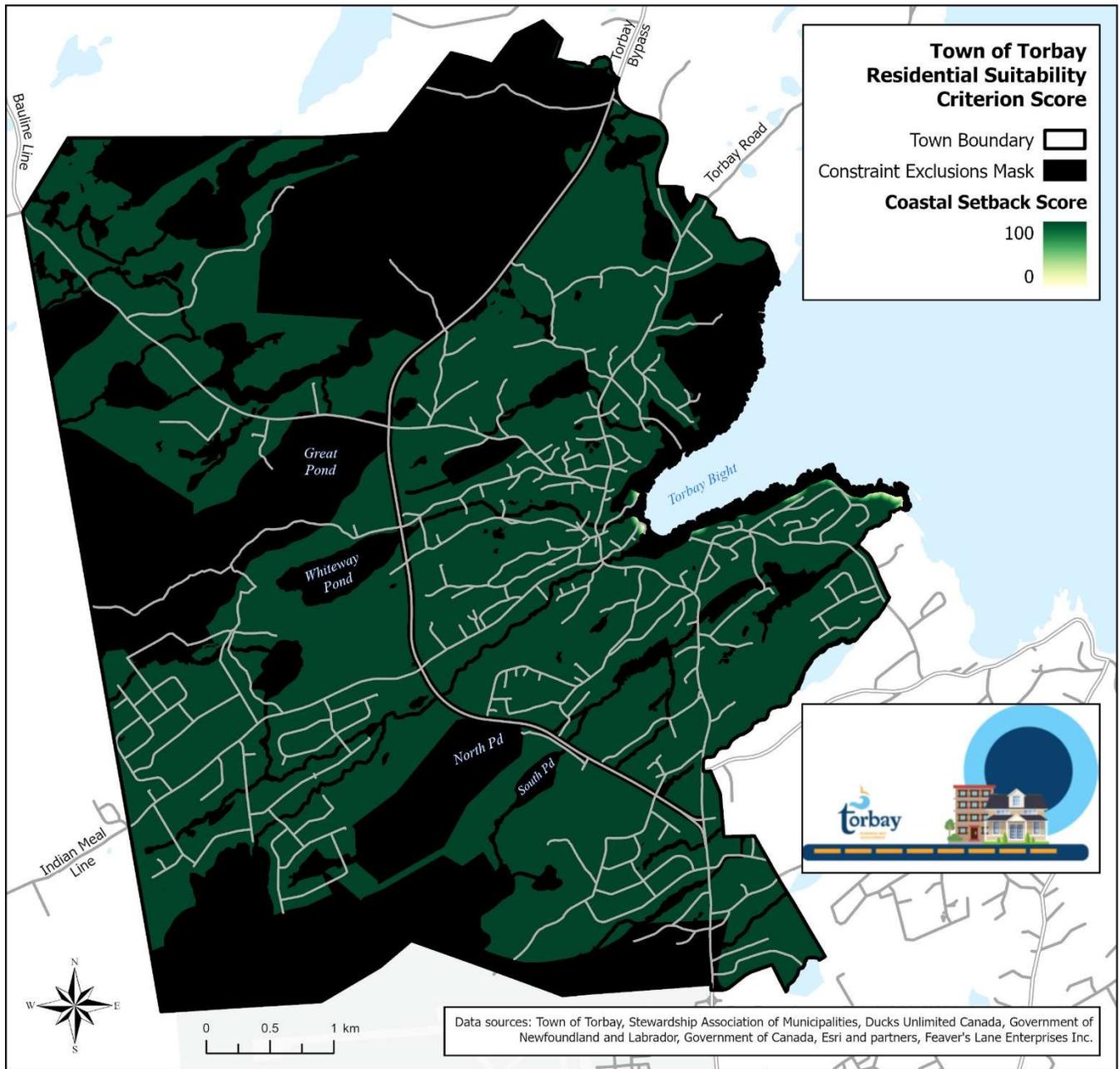


Figure 11 – Map of Coastal Setback Score

Note that within 30m of the coast was scored as zero, from 30m to 100m from the coast was scored using a linear progression from zero to 100, and greater than 100m from the coast was scored as 100. Most coastal areas are already excluded by Stewardship Association of Municipalities conservation and provincial ADAs.

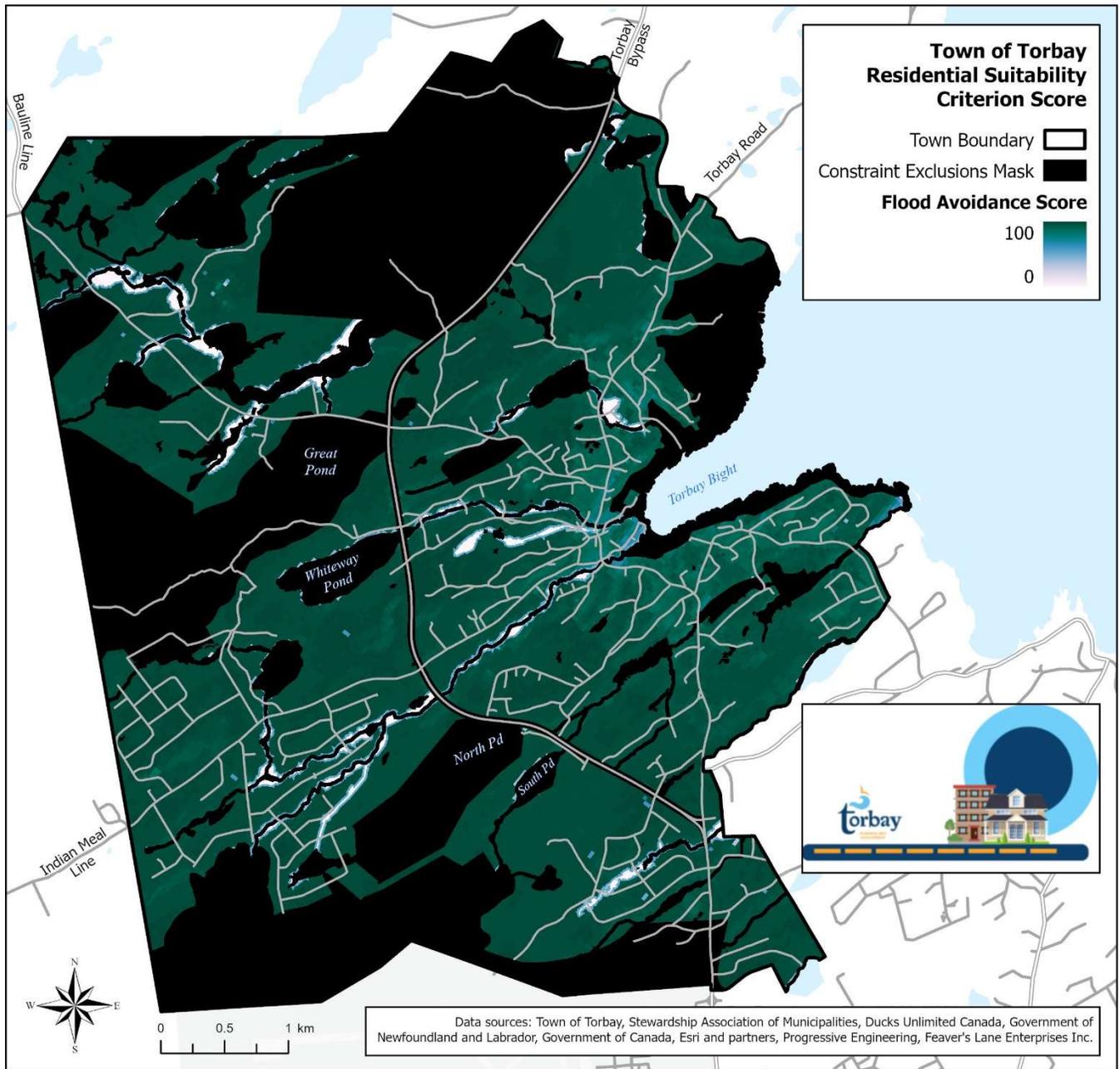


Figure 12 – Map of Flood Avoidance Score

Note that coarse-scale flood susceptibility model outputs from Natural Resources Canada were augmented with finer-scale delineations from Progressive Engineering, where available.

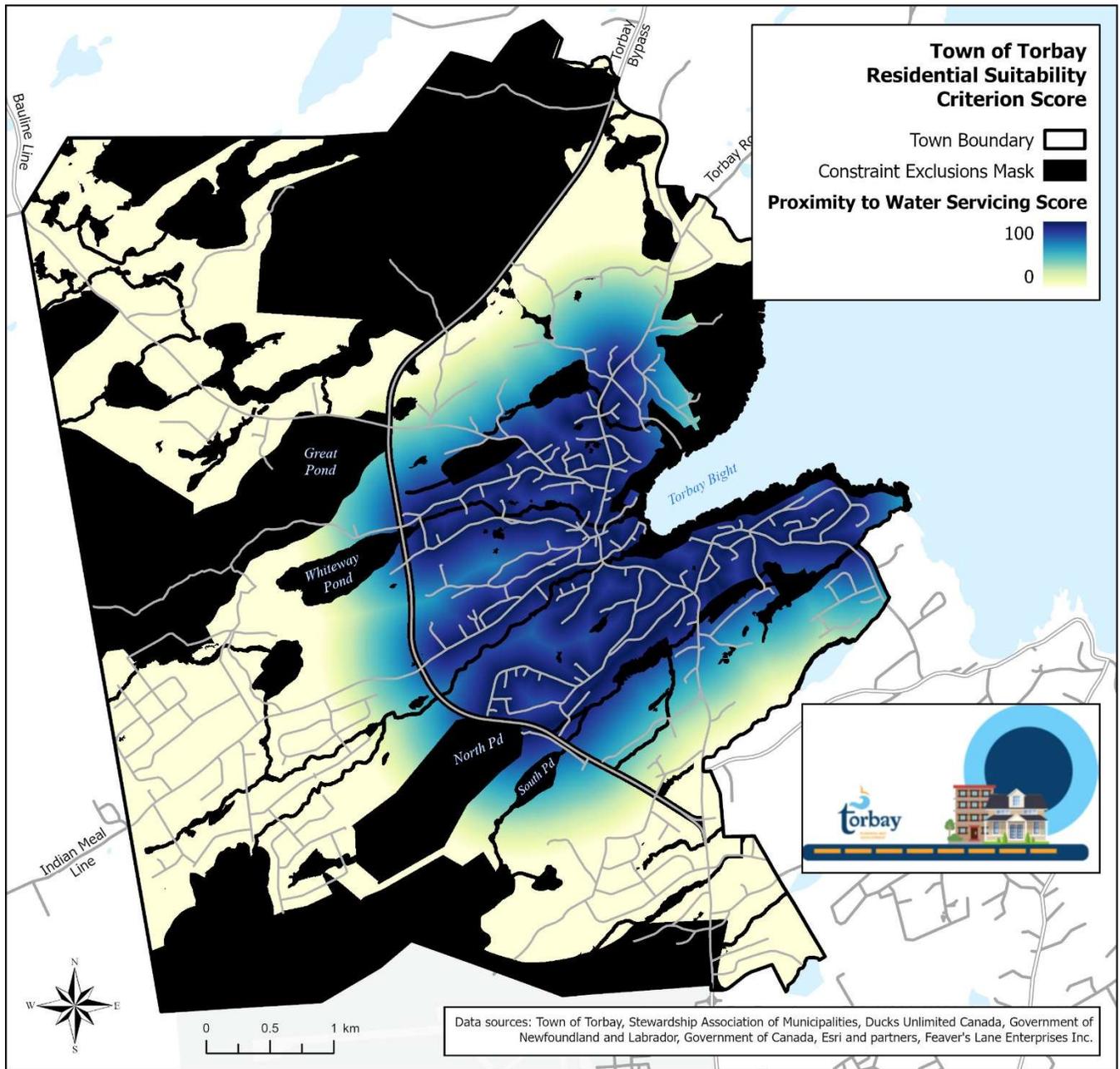


Figure 13 – Map of Proximity to Water Servicing Score

Drinking water serviced lots are in the heart of Town around Torbay Bight. The Town has experienced recent challenges with capacity in its piped potable water supply at North Pond (CBC, 2025) but planning efforts to improve the situation have been underway for several years (WSP, 2024) and there was a recent funding announcement for construction of a new municipal water supply at Great Pond (CBC, 2026).

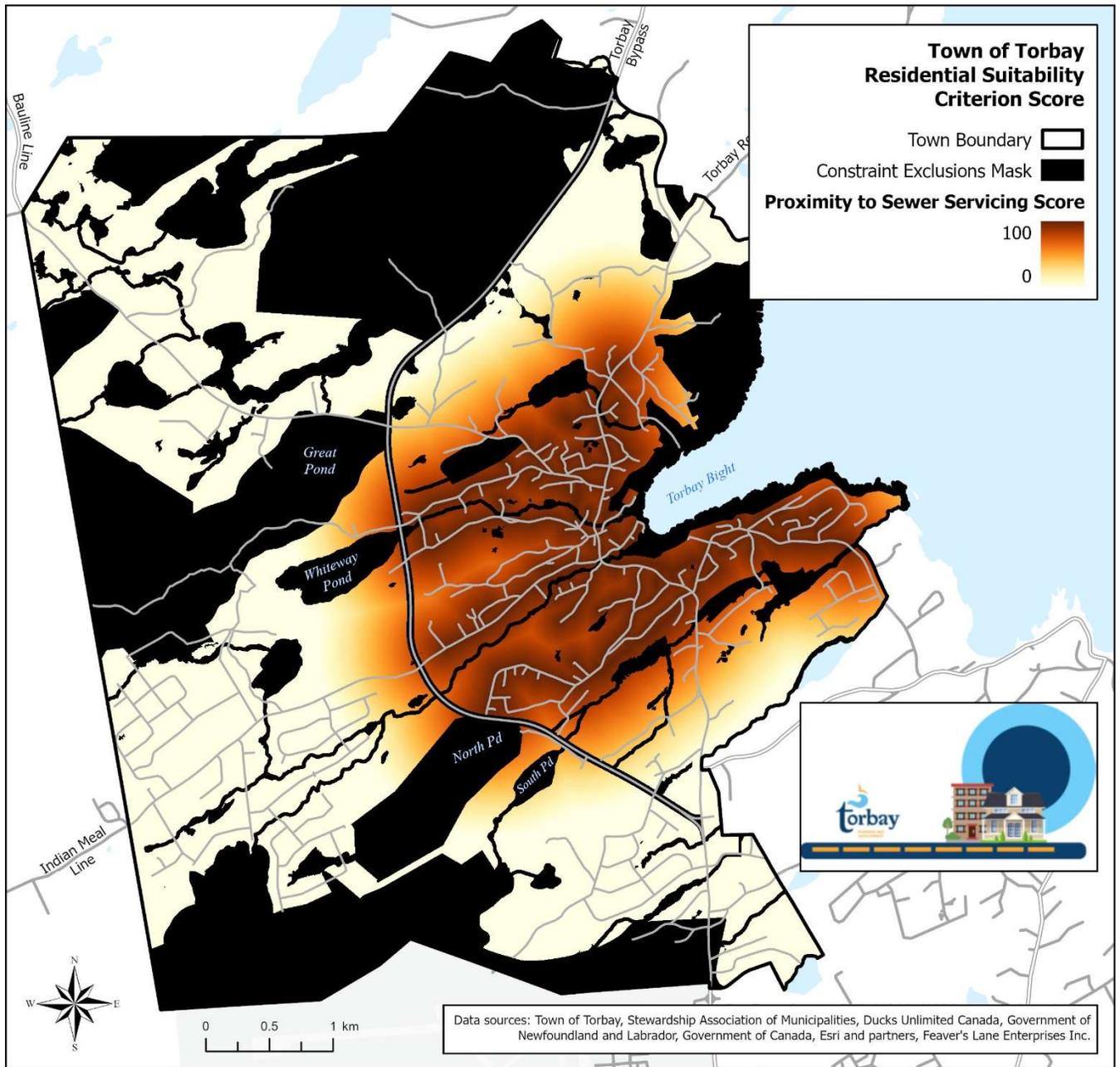


Figure 14 – Map of Proximity to Sewer Servicing Score

Town sewer servicing has similar, but not identical, coverage as water servicing.

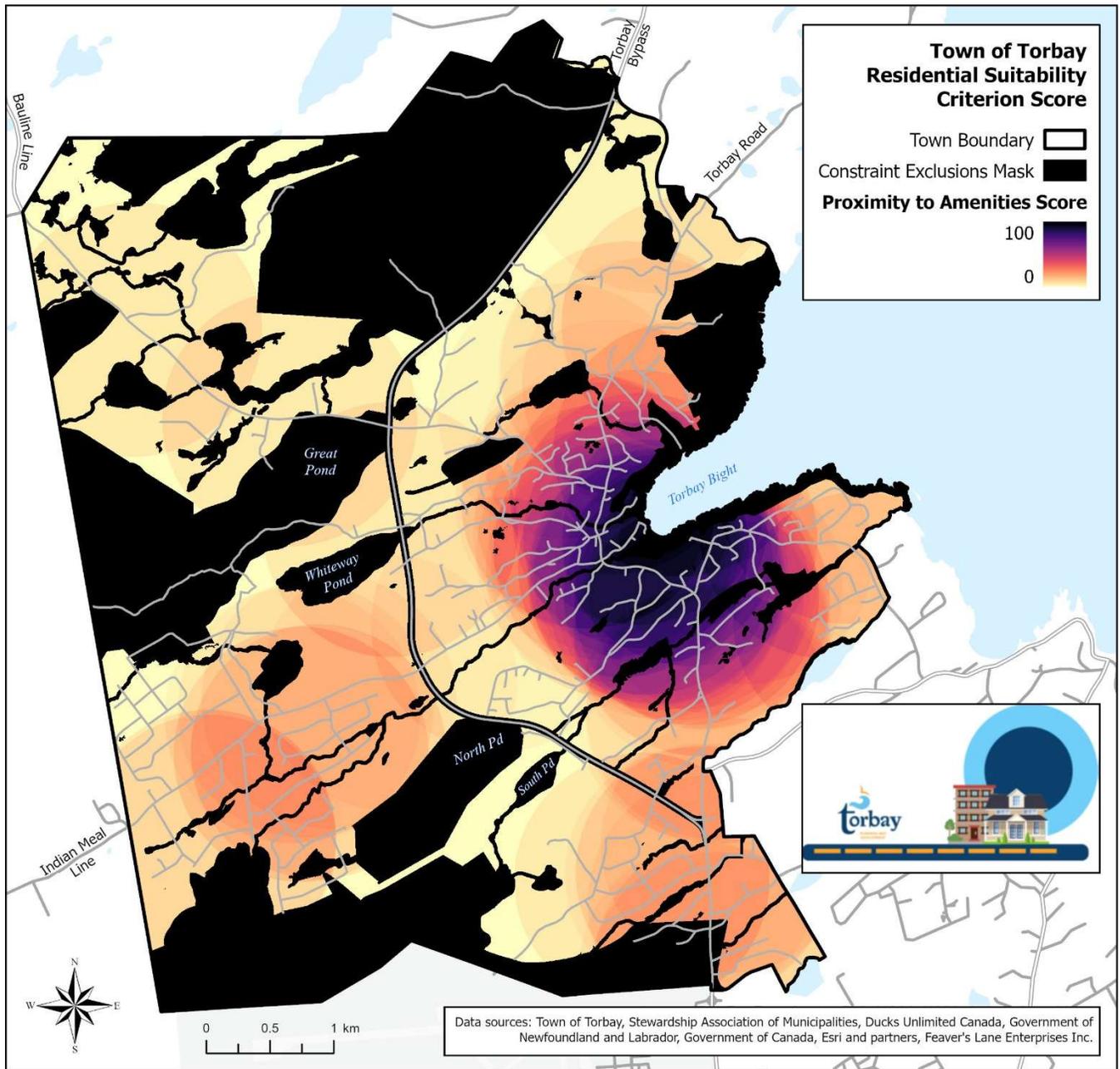


Figure 15 – Map of Proximity to Amenities Score

Outdoor amenities like trails and playgrounds have been scored twice as high as retail and other indoor services to reflect natural features being a key element of Torbay’s appeal as a residential community. The full list of amenities is provided in Appendix G – Included Amenity Points.

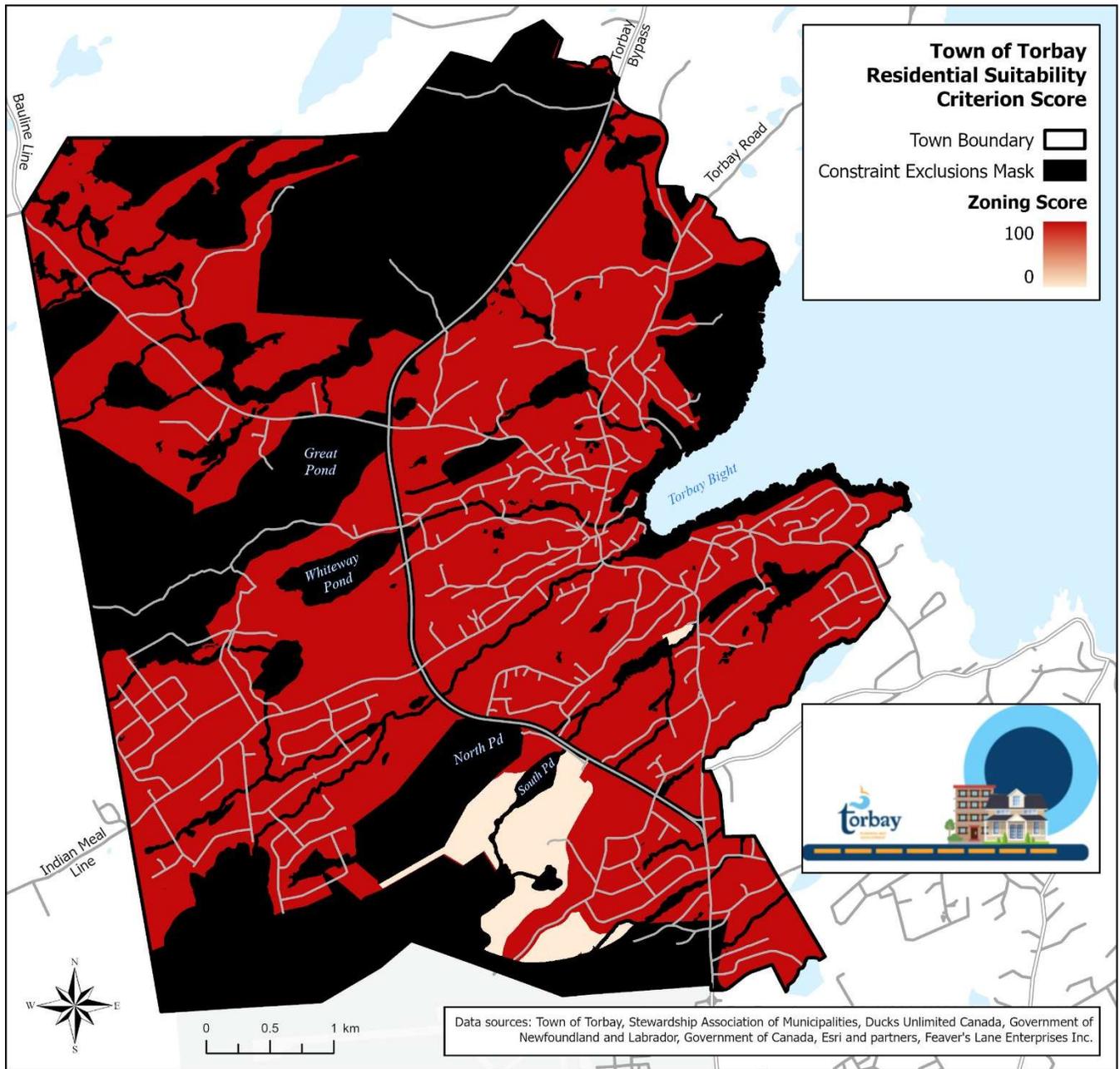


Figure 16 – Map of Zoning Score

In Figure 16, Industrial zones that are unlikely to be rezoned for residential use have been given a lower score.

4.2. Weighted Sum Scenario Outputs

Appendix D – Suitability Criteria Table details the grouping and default weighting of the criteria. With grouping, criteria within each group (Accessibility, Natural Features, Services, Zoning) are first combined using a weighted sum to create intermediate scoring outputs, then the group outputs are combined using a weighted sum to create the overall score output.

Five scenarios have been included for consideration:

- A. Groups and weights as per Appendix D – Suitability Criteria Table. In this scenario, equal weights have been used within each group as well as across groups when combining them.
- B. Zoning downweighted. In this scenario, equal weights within groups have been maintained, but in combining the group scores the Zoning group has been given 10% of the weight and the other three groups have each been given 30% of the weight.
- C. Zoning downweighted plus water servicing and coastal setback excluded. In this scenario, water servicing has been excluded because of the unreliable volume of water available in recent years to provide water from Town water supplies to connected households, and also because water servicing areas are largely (but not entirely) redundant with sewer servicing areas. Coastal setback has also been excluded from this scenario because it is almost entirely covered by constraints/exclusions including conservation zoning, SAM conservation areas and ADAs.
- D. No grouping. In this scenario, all nine criteria have been given equal weighting and combined in a single step.
- E. No grouping plus water servicing and coastal setback excluded. See Scenario C above for the rationale for these exclusions. No grouping also provides a form of sensitivity analysis, whereby changes in output score are evaluated across scenarios.

All scenario outputs share common characteristics:

- No areas are perfectly suitable (max score is 94) or totally unsuitable (min score is 10) for residential development in Torbay.
- The heart of Town around Torbay Bight is the most suitable, given the proximity to water/sewer servicing and more amenities.
- Areas further from the centre of Town score lower as they are unserviced and have fewer amenities, making them less “walkable.”
- Areas further from roads and with higher slopes also score lower.
- All areas of Town benefit from the natural values of a rural setting with many outdoor amenities.
- Areas with industrial zoning and high flood risk clearly stand out as unsuitable.
- The minimal overall score differences across all scenarios demonstrates that the analysis is not especially sensitive to small changes in criteria grouping or weighting.

In the interests of brevity, the maps and additional commentary for the scenarios are provided in Appendix E – All Suitability Scenario Outputs. Because the lack of criteria grouping makes it the easiest to explain and the redundancies described in bullet C above are eliminated, Scenario E is highlighted below in Figure 17 and in the Introduction and Executive Summary. Scenario E scores are also used to calculate the average suitability in the Areas/Sites Assessment Examples section.

Additional information on these methods, including the steps for running weighted sum scenarios using GIS software is provided in Appendix F – Residential Suitability Methods.

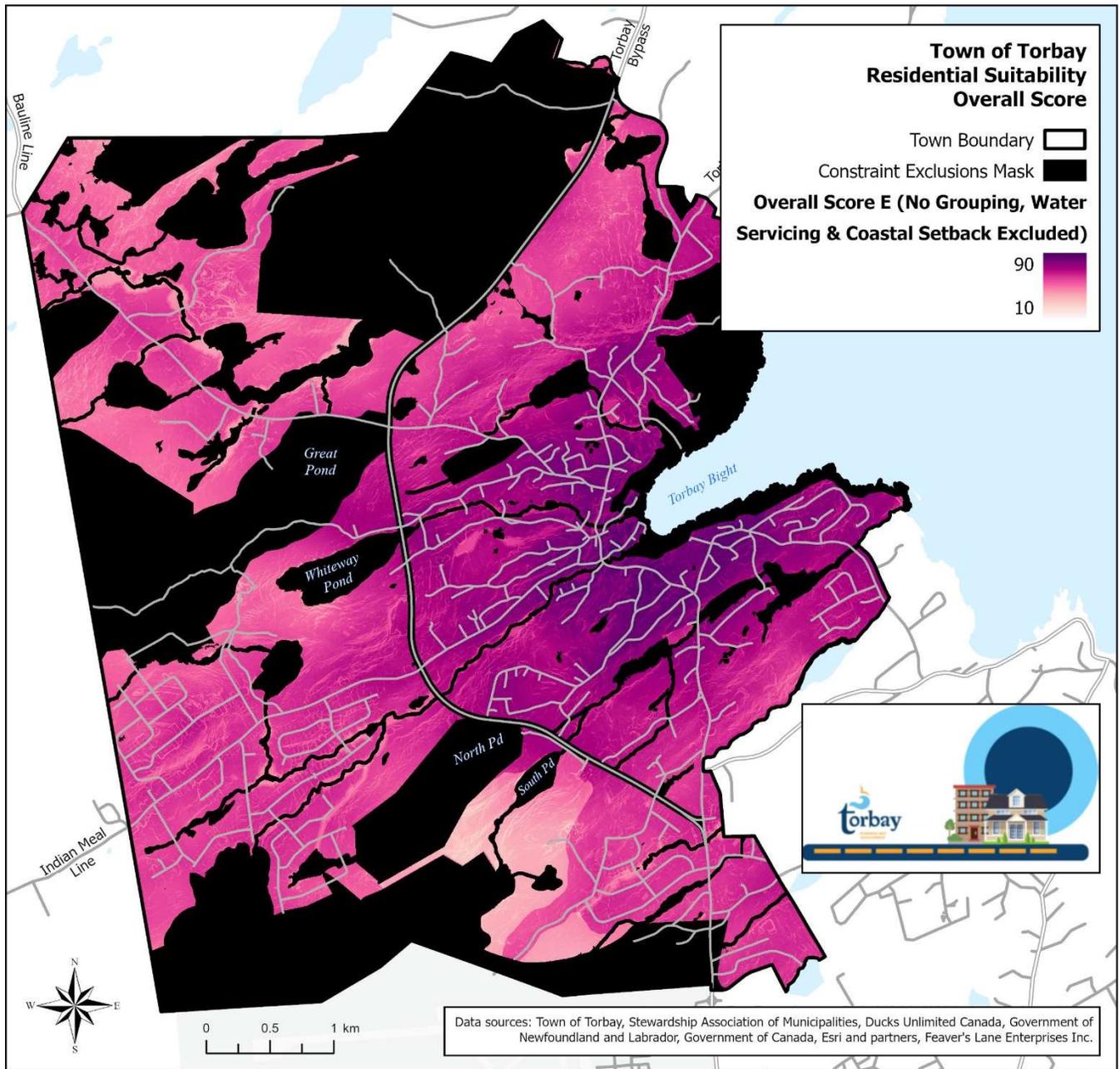


Figure 17 – Map of Overall Residential Suitability Scenario E (no grouping, water servicing & coastal setback excluded)

5. Neighbourhood Socioeconomic Summaries

StatCan Dissemination Areas (DAs) are neighbourhoods with an average population of across Canada of approximately 400 to 700 people (Statistics Canada, 2021a). The 11 DAs in Torbay are mapped in Figure 18. The neighbourhood labels have been provided by Town staff.

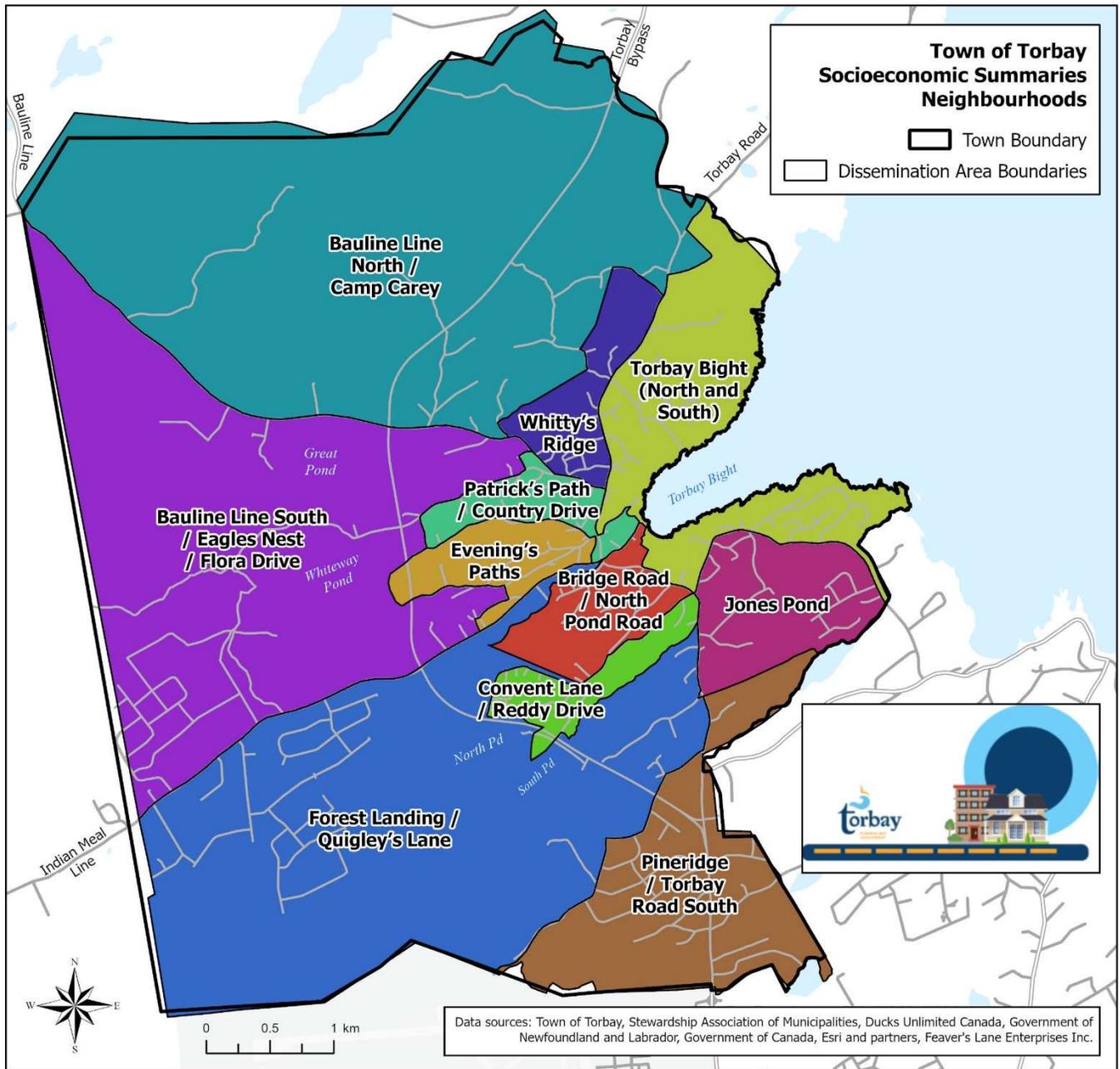


Figure 18 – Map of Torbay Neighbourhoods (StatCan Dissemination Areas)

A suite of descriptive socioeconomic statistics is available for DAs, and two themes have been mapped below. Figure 19 has the absolute 2021 population (not density) as the underlying mapped theme, with the proportion by age group graphed as an overlay. Figure 20 has the average household size as the mapped underlay with the dwelling count by type graphed as an overlay.

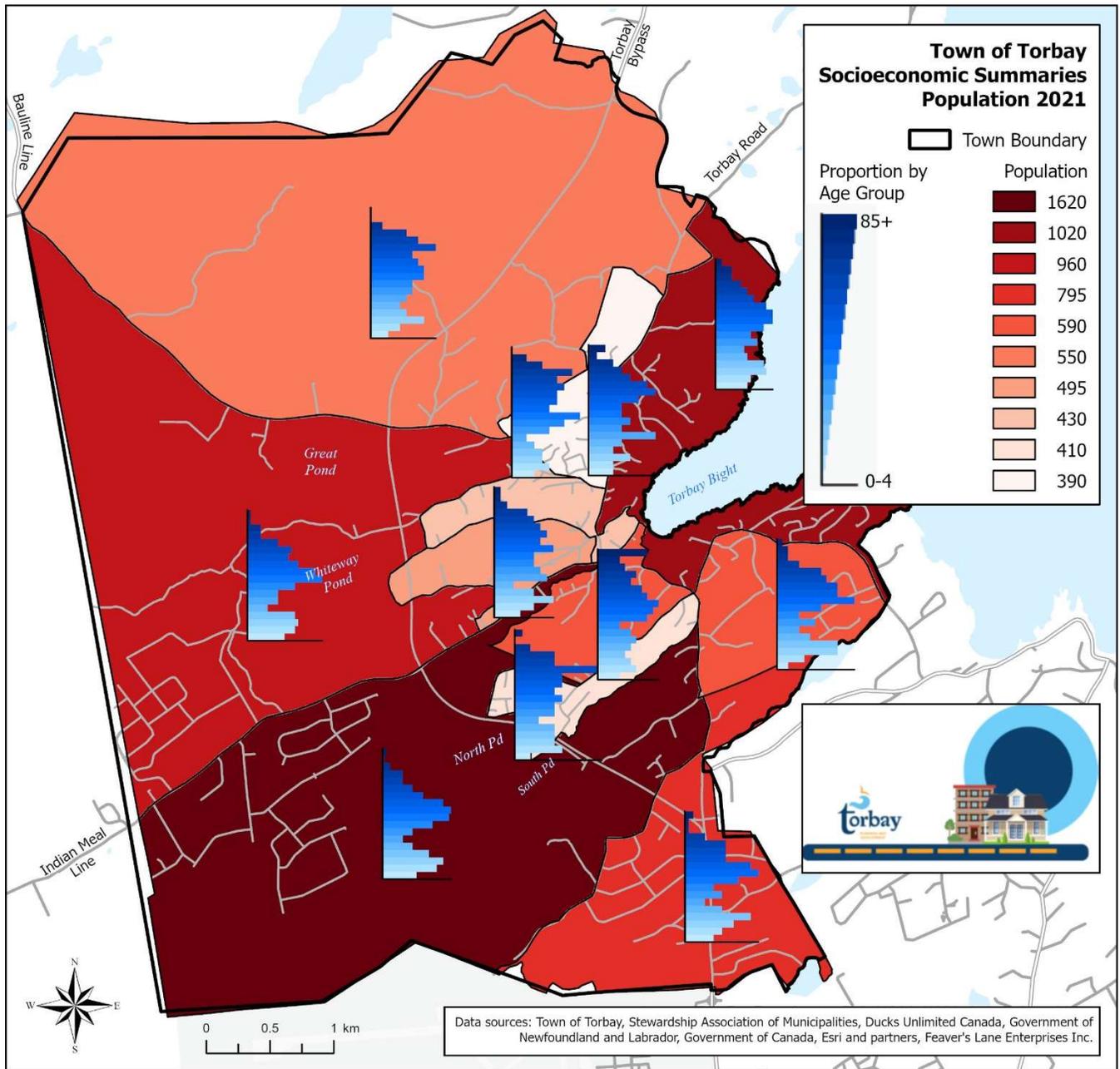


Figure 19 – Map of 2021 Population and Age Groups by StatCan Dissemination Area
(Note: does not represent population density)

In Figure 19, the length of the bars in the age group graphs reflect the relative proportion of the age groups in five-year increments (0-4, 5-9, 10-14, ..., 85+).

The 2021 average age Town-wide was 40.3 years and median age was 42.8 years, both with a range of values of approximately 9 years across the Town's DAs (Statistics Canada, 2021b). One noteworthy trend is that the average and median ages have both increased almost three years since the 2016 census. Other noteworthy trends are the high proportion of 85+ people in the Bridge Road / North Pond Road neighbourhood, and the high proportion of people in most neighbourhoods who are approaching or of retirement age and will likely want to avail

of aging-in-place strategies including secondary suites, slab on grade single-storey homes, and homecare services.

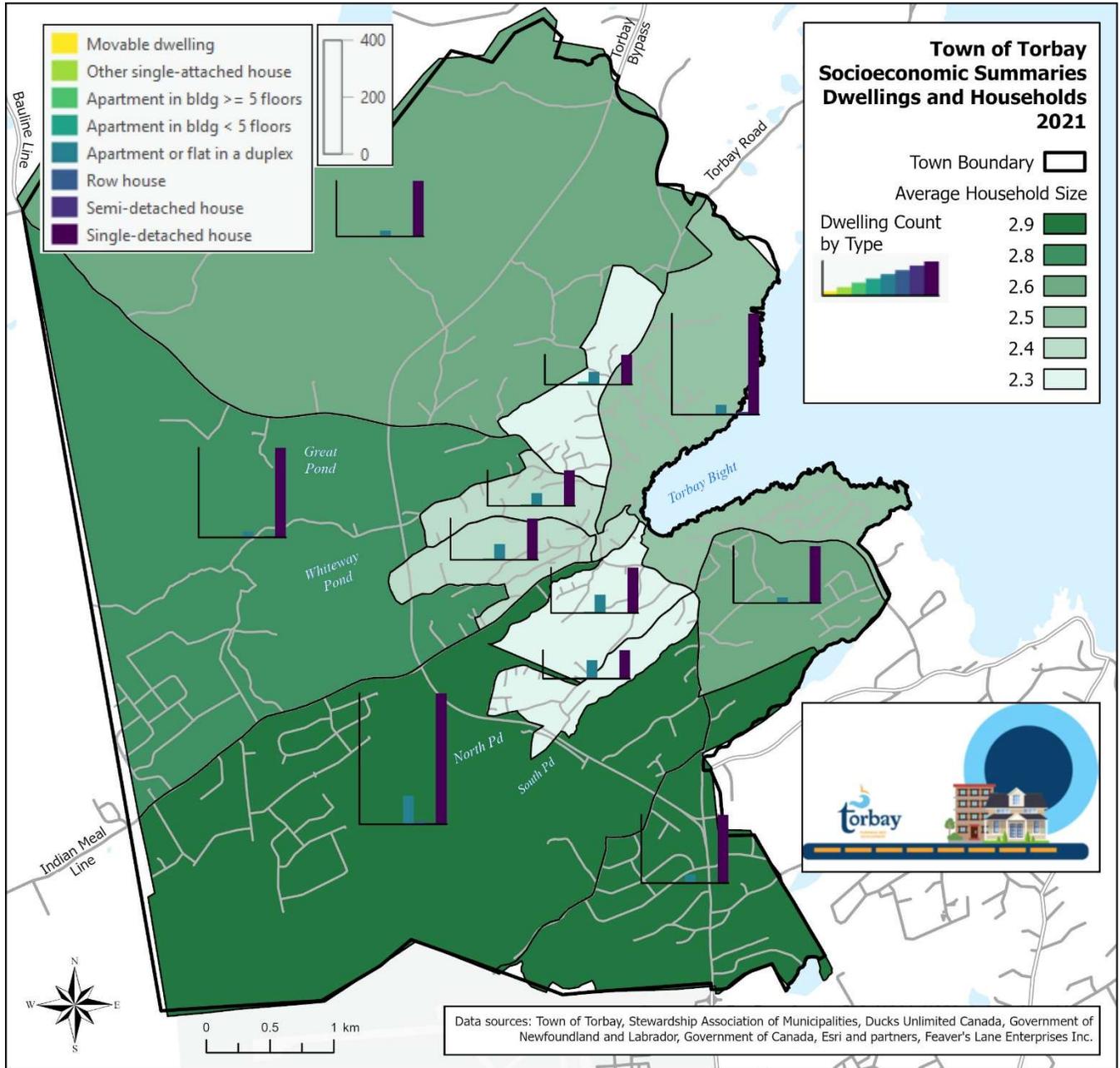


Figure 20 – Map of 2021 Household Size and Dwelling Types by StatCan Dissemination Area

In Figure 20, the height of the dwelling count by type bars reflects the absolute count of each dwelling type. Torbay has almost exclusively single-detached houses and apartments in houses. The other StatCan dwelling types are shown as food for thought as housing policy in the Town evolves. For example, some of the other dwelling types could be appropriate to support more affordable and “missing middle” housing including secondary suites, backyard suites, double dwellings, row dwellings, apartment/condo buildings and other aging-in-place strategies mentioned above (Town of Torbay, 2024a; Town of Torbay, 2024b).

Neighbourhood socioeconomic factors can also be summarized in tabular format. A selection of descriptive StatCan statistics is shown in Figure 21.

Neighbourhood (Dissemination Area)	2021 Statistic						
	Average/Median Age (years)	Average/Median After-tax Family Income (\$)	Proportion One-parent Families (%)	Proportion One- census-family Households* (%)	Proportion with Non-English Mother Tongue (%)	Proportion with any Non-English Spoken at Home (%)	Proportion of Visible Minorities (%)
Bauline Line North / Camp Carey	41/43	102,000/94,000	11	77	0.0	0.9	0.0
Bauline Line South / Eagles Nest / Flora Drive	38/41	113,000/114,000	13	78	0.5	1.6	0.0
Bridge Road / North Pond Road	47/49	88,000/96,000	18	65	2.5	1.7	0.0
Convent Lane / Reddy Drive	43/45	84,000/85,000	23	67	1.2	2.4	0.0
Evening's Paths	40/41	92,000/86,000	19	71	2.0	2.0	0.0
Forest Landing / Quigley's Lane	36/40	131,000/123,000	13	77	1.9	2.2	0.0
Jones Pond	41/46	121,000/141,000	11	70	1.7	1.7	0.0
Patrick's Path / Country Drive	45/46	94,000/86,000	15	67	1.2	1.2	0.0
Pineridge / Torbay Road South	39/43	172,000/137,000	7	78	0.6	1.3	5.6
Torbay Bight (North and South)	40/43	103,000/101,000	16	68	4.4	2.9	2.3
Whitty's Ridge	45/47	92,000/82,000	20	65	3.8	3.8	2.8

Figure 21 – Selected StatCan 2021 Dissemination Area (neighbourhood) Statistics
(*Other StatCan Household types: multigenerational, multiple-census-family, one-census-family households with additional persons, two-or-more-person non-census-family households, one-person households)

Comparing two neighbourhoods, Bauline Line North / Camp Carey and Whitty's Ridge, the latter has a substantially older population but somewhat lower family incomes. Whitty's Ridge has a higher proportion of one-parent families and a lower proportion of one-census-family households (i.e., more households with grandparents, unrelated housemates or others who would complete their own census forms). The final three statistics in Figure 21 speak in part to immigration and ethnicity, with Whitty's Ridge being more diverse than Bauline Line North / Camp Carey in these regards.

Insights on Torbay's and the province's socioeconomics and housing beyond those provided by StatCan are available through RANLab (<https://www.ranlab.ca/data-portal>) and the Newfoundland and Labrador Statistics Agency (<https://www.stats.gov.nl.ca/>).

6. Areas/Sites Assessment Examples

The analyses in the preceding sections can be combined to help identify and assess areas or sites or interest for residential development. At this scale, considerations like construction logistics and ownership status can be considered. For this report, illustrative examples are highlighted in Figure 22.

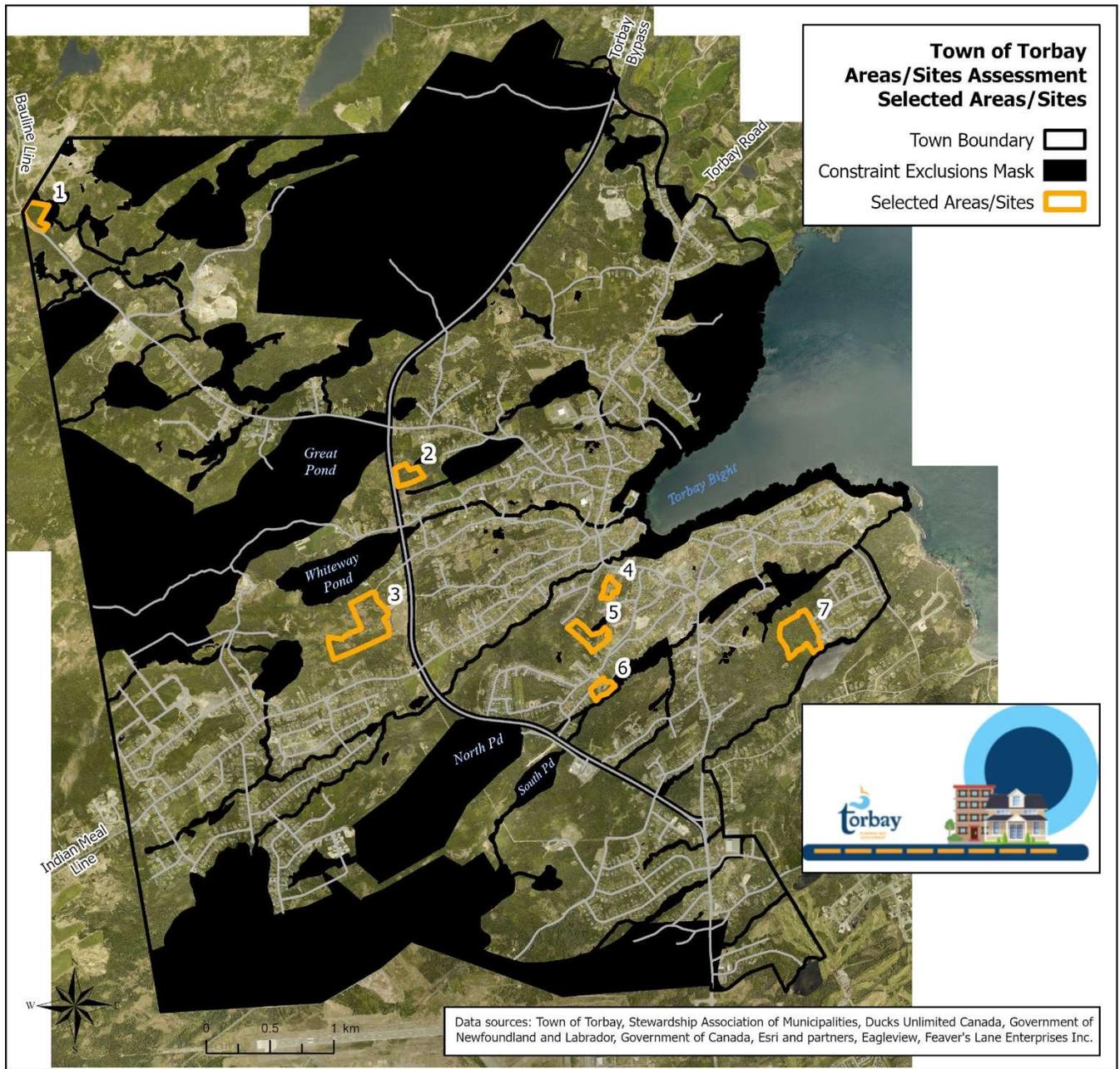


Figure 22 – Map of Selected Areas/Sites for Detailed Assessment (examples only)

These examples have been chosen based on ownership status of Public or Assumed Public in Figure 4. However, the primary purpose of these examples is to illustrate the assessment process, and they are not necessarily suitable for development. Figure 23 highlights important considerations when assessing land for potential development of these areas.

Consideration	Area/Site 1	Area/Site 2	Area/Site 3	Area/Site 4	Area/Site 5	Area/Site 6	Area/Site 7
Neighbourhood	Bauline Line North / Camp Carey	Bauline Line South / Eagles Nest / Flora Drive	Bauline Line South / Eagles Nest / Flora Drive	Bridge Road / North Pond Road	Bridge Road / North Pond Road	Convent Lane / Reddy Drive	Jones Pond
Location	Bauline Line	Between Withrod Pond and Torbay Bypass	Birchy Nap Hill Road	Between Torbay Road and Byrne's Place	Between Bridge Road and North Pond Road	Tynedale Drive	Torquay Place
Ownership Status	Assumed Public	Assumed Public	Assumed Public	Assumed Public	Assumed Public	Assumed Public	Public
Average Suitability Score (Scenario E, out of 100)	73	80	66	65	75	60	55
Size (ha)	2.8	2.4	11.6	1.4	3.3	1.7	7.3
Average Slope (%)	5.8	6.8	8.9	5.2	7.9	8.9	5.2
Land Use Zone	Residential Infill / Rural	Residential Subdivision	Residential Infill / Rural	Residential Medium Density	Residential Medium Density	Residential Subdivision	Residential Large Lot
Distance from Road (m)	0	225	0	75	55	0	0
Distance from Water/Sewer (m)	4000	250	500	100	75	0	500

Figure 23 – Key Considerations for Selected Areas/Sites (examples only)

Comparing Areas/Sites 1 and 5, their average suitability scores are very close and in the mid range. Area/Site 5 is about 20% larger than Area/Site 1 but has a higher average slope. There is, however, substantial variation in flatness within each site (ranging from flat to 24% slope in Area/Site 1 and flat to 50% slope in Area/Site 5). Part of Area/Site 1 would require rezoning for residential development to occur in that portion. Neither would require substantial external road development to facilitate access. Area/Site 5 is much closer to existing water/sewer infrastructure.

Note that this type of assessment can be applied to any area of any size, whether public or private or uncertain.

7. Conclusions and Recommendations

Despite the challenges in determining public versus private land, the amount of public land available for development in the Town of Torbay appears to be quite limited (see Figure 1 or Figure 4). Much of the assumed public land (based on available information) may prove to be private, and the legal land title process should be used to confirm the status of areas of interest before making any substantial investments of time or money. Updating this delineation, for instance investigating areas of interest and continuing to digitize surveys, will require ongoing diligence.

As discussed above, the analyses presented in this report can be used independently or in conjunction with each other. The constraints analysis to identify areas that should be excluded from consideration for residential development masked about one-third of the Town. It could be updated as priorities and available information evolve. Similarly, suitability

inputs could be updated periodically; for instance, when each iteration of the Town plan is approved, the zoning suitability layer could be updated to reflect zones that allow residential development (score of 100), zones that are very unlikely to ever be appropriate for residential development (score of zero), and zones that Council may want to consider for rezoning or case-by-case discretionary exceptions (score of 50).

The most suitable areas for development are in the heart of Town around Torbay Bight. However, much of this area has already been developed or is constrained from residential development. Densification of this part of Town, including alternative dwelling types, should be strongly considered. The suitability analysis could be easily extended by running additional scenarios with different weights and/or including/excluding select input layers. In the longer term, new input layers could be identified and assembled, and existing suitability input layers could be updated to reflect new information. Some scoring improvements could also be considered for future updates, such as using a maximum distance cutoff for distance from wetlands and applying this criterion to upslope/upstream areas only.

Socioeconomic summaries could be updated once the 2026 census results are published, and suitable areas/sites assessment could be applied to any area/site of interest. A related recommendation is to incorporate and integrate the inputs and outputs from all the analyses covered in this report into the Town's operational databases, information systems and workflows.

A secondary recommendation is to improve data and policy coordination with the provincial and federal governments, including updating outdated spatial data such as StatCan dissemination area boundaries and ensuring updated wetland delineations are recognized by the province in the application of wetland policy to development proposals.

Feaver's Lane has been honoured to partner with the Town and the Planning and Development team on this important work and we would be happy to consider future collaboration opportunities.

References

- CBC, 2025. After a dry summer, N.L. communities left worrying about future water problems. Canadian Broadcasting Corporation. Available at <https://www.cbc.ca/news/canada/newfoundland-labrador/nl-water-problems-9.6955085>.
- CBC, 2026. Torbay greenlights new water development as residents struggle with town supply, wells. Canadian Broadcasting Corporation. Available at <https://www.cbc.ca/news/canada/newfoundland-labrador/torbay-water-problems-9.7053522>.
- Government of Newfoundland and Labrador, 2025a. Registry of Deeds. Information at <https://www.gov.nl.ca/gs/registries/deeds/>.
- Government of Newfoundland and Labrador, 2025b. Land Use Atlas. Available at <https://www.gov.nl.ca/crownlands/land-use-atlas/>.
- Government of Newfoundland and Labrador, 2025c. GIS Data for Public Water Supplies. Available at <https://www.gov.nl.ca/eccc/waterres/drinkingwater/protectedareas/gis-data-for-public-water-supplies/>.
- Greene, R. 2010. Addressing accessibility challenges of GIS-based multiple-criteria decision analysis for integrated land management: case study in the Humber region of Newfoundland and Labrador, Canada. Memorial University of Newfoundland MSc thesis. Available at <http://research.library.mun.ca/9520/>.
- Greene, R., Devillers, R., Luther, J.E., Eddy, B., 2011. GIS-based Multiple Criteria Decision Analysis (MCDA”, Geography Compass 5(6), 412-432. Available at <http://dx.doi.org/10.1111/j.1749-8198.2011.00431.x>
- Natural Resources Canada, 2025a. Canada Lands: Boundaries and land surveys. Available at <https://natural-resources.canada.ca/maps-tools-publications/maps/atlas-canada/canada-lands-surveys>.
- Natural Resources Canada, 2025b. Topographic Data of Canada - CanVec Series. Available at <https://open.canada.ca/data/en/dataset/8ba2aa2a-7bb9-4448-b4d7-f164409fe056>.
- Natural Resources Canada, 2025c. High Resolution Digital Elevation Model (HRDEM) - CanElevation Series. Available at <https://open.canada.ca/data/en/dataset/957782bf-847c-4644-a757-e383c0057995>.
- Natural Resources Canada, 2025d. Flood Susceptibility Index (FSI). Available at <https://open.canada.ca/data/en/dataset/df106e11-4cee-425d-bd38-7e51ac674128>.
- Progressive Engineering, 2019. Torbay - Stormwater Management Plan. Prepared by Progressive Engineering & Consulting Incorporated, June 19, 2019.

Statistics Canada, 2021a. Dictionary, Census of Population, 2021. Available at <https://www12.statcan.gc.ca/census-recensement/2021/ref/dict/az/definition-eng.cfm?ID=geo021>.

Statistics Canada, 2021b. Census Profile, 2021 Census of Population. Available at <https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&DGUIDlist=2021A00051001509>.

Town of Torbay, 2024a. Town of Torbay Housing Needs Assessment. Prepared by Julia Schwarz, September 12, 2024. Available at <https://www.torbay.ca/media/qlffpr2s/torbay-2024-housing-needs-assessment-final.pdf>.

Town of Torbay, 2024b. Town of Torbay Housing Action Plan: Housing Accelerator Fund Application (HAF-2) Proposed Initiatives. Prepared by Julia Schwarz, September 12, 2024. Available at <https://www.torbay.ca/media/hfwhc3pp/torbay-housing-action-plan-haf2-september-12-2024-final.pdf>.

WSP, 2017. St. John's International Airport Master Plan Update 2015-2035. Prepared by WSP Canada Inc., January 2017. Available at <https://stjohnsairport.com/wp-content/uploads/2017/03/St.-Johns-International-Airport-Master-Plan-Update-2015-2035-sm.compressed.pdf>.

WSP, 2024. Water System Servicing Study - North Pond / Great Pond. Prepared by WSP E&I Canada Limited, January 11, 2024.

Electronic Appendix A – December 2025 PowerPoint Presentation to Council

[Torbay Developable Public Land Inventory V3.pptx](#) (note: this presentation is based on earlier draft results).

Appendix B – Public Land Data Management

Crown Land and Clear Title Context

In Newfoundland and Labrador, determining land ownership and clear title is often complex due to the province’s history of Crown ownership. “Clear title” generally means that ownership of a piece of land is clearly established, not disputed, and not subject to unresolved claims. There is no requirement to register deeds, which further complicates ownership verification.

The Crown Lands Vault can provide access to available land records, including surveys and related documents; however, Crown Lands staff do not confirm ownership. Information from the Vault is intended to support further review, typically with the help of a lawyer or paralegal.

Having a survey, deed or proof of purchase does not necessarily mean that land has clear title. If land was never formally granted by the Crown, the Crown may still technically retain ownership, even if the land has been occupied or transferred privately for many years.

Where ownership is uncertain, landholders may need to use formal legal processes to clarify title, such as applying for a Crown Grant, or going through the Quieting of Titles process. While spatial datasets showing Quieting of Titles areas are generally treated as private land, Crown Lands staff do not track the outcomes of individual cases and cannot confirm whether title was ultimately resolved.

As advised by Crown Lands Vault staff, when using the Land Use Atlas, any area without a mapped Crown Grant polygon is assumed to be Crown land.

For the purposes of screening potential residential development areas on public land, priority should be given to land with no Crown Grants, registry deed records or entries in the Town’s GIS parcel data, to minimize the possibility that sites would require complex legal investigation or land acquisition processes.

Glossary of Crown Lands Terms

Listed roughly from strongest to weakest form of title.

Grant – a transfer of Crown land into private ownership:

- Strongest form of title
- Once granted, the land is no longer Crown owned
- Often represents older titles or parcels formally conveyed out of Crown ownership

Lease –gives an individual or organization the right to occupy and use Crown land for a defined period:

- Ownership remains with the Crown
- Common for cabins, commercial uses, agriculture, etc.

- Terms, rent, and conditions apply

License – provides short-term or conditional permission to use Crown land:

- Does not provide exclusive possession
- Often used for temporary uses, access, small structures, or resource activities

Permission – the most temporary and informal Crown land authorization.

- Used for minor, low-impact activities
- No exclusive rights
- Typically short duration and easily revoked

Transfer – reflects a change in ownership or interest recorded against an existing title:

- Usually represents a conveyance between private parties following an original Crown grant
- Does not involve new grant being issued

Expropriated Land – has been legally acquired by the Crown for public use or infrastructure:

- Typically supported by legislation, survey plans, and formal documentation

Orders in Council – directives that authorize land transactions, boundary changes, or land-use decisions involving Crown property:

- Often used to formalize transfers or administrative actions

Quieting of Titles – legal proceedings used to resolve uncertainty or disputes over land ownership:

- Records often include court decisions, surveys, and supporting evidence
- Used to clarify or confirm title

Quit Claim – a document in which a party relinquishes any interest or claim to a parcel of land:

- Commonly used to resolve title issues or overlaps
- Does not guarantee ownership

Bowater Land Sales – historical land sales associated with Bowater or related forestry companies:

- May include older surveys, tenure agreements, or sale records affecting present-day ownership

Titles to Check – a working category for parcels requiring further verification:

- Typically used where ownership, boundaries, or documentation are incomplete or inconsistent

Miscellaneous Crown Land Information – supporting records that do not fit a specific category:

- May include correspondence, notes, or unclassified survey material relevant to land management

Data Attributes

Figure 24 describes the Ownership polygon fields/columns delivered to the Town with the GIS data package.

Field Name	Alias	Description
OBJECTID	OBJECTID	System-generated unique identifier for each record.
Parcel_ID	Parcel_ID	Property identifier assigned by the Town of Torbay or Municipal Assessment Agency (MAA).
CIVIC	CIVIC	Civic address associated with the parcel, where available.
Ownership	Ownership	General ownership classification for the parcel (e.g., Municipal, Provincial Crown, Federal, Private, Other).
Confidence	Confidence	Relative confidence in the assigned ownership classification based on available records and supporting evidence.
Source	Source	Primary data source(s) used to determine ownership (e.g., Town parcel data, Crown Land title type).
Notes	Notes	Additional comments
Property_ID	Property ID	Property identifier assigned by the Newfoundland and Labrador Crown Lands Department.
TITLENO	Title Number	Crown title number associated with the parcel or land record, where applicable.
VOLUME	Volume Number	Registry volume number associated with the deed or title record.
FOLIO	Folio Number	Registry folio number associated with the deed or title record.
DOCUMENTNO	Document Number	Registry document number referencing a recorded transaction or land record.
APPLICANT	Original Title Owner	Name of the original applicant or registered title holder associated with the Crown land record.
COURTNO	Supreme Court Number	Supreme Court file number associated with Quieting of Titles or related legal proceedings.
DEEDNO	Deed Number	Deed number associated with a registered deed or conveyance, where available.

Figure 24 – Ownership Data Attributes

Reconciling new parcel data (Town Parcel layer) with “private” polygons:

- Use the Append tool to add new parcel features to the private layer.

- The Append tool appends selected features from one or more input datasets into an existing target dataset.
- In the Town Parcel layer, select the new parcel features to be added.
- Run the Append tool with the following parameters:
 - Target Dataset: Private
 - Input Dataset: Selected features from the Town Parcel layer
 - Field Matching Type: Use Field Map to reconcile field differences
- Ensure both datasets include the CIVIC and Parcel_ID fields so these attributes carry over correctly.
- Enable Undo before running the tool.
- Note: This operation does not create a new layer and will permanently modify the target dataset.

Appendix C – Constraints Table

Category	Exclusion (Constraint)	Description	Notes/Questions	Dataset(s)
Not Land	Waterbodies (>1ha/10,000m ²)		Mostly covered by other exclusions	Canvec 1:50K
Natural Features	Wetlands	Wetland inventory (existing and forthcoming)	Wetlands are a constraint; distance from wetlands is a criterion	DRAFT from work-in-progress via Fundamental Inc. project
Natural Features	SAM Conservation Areas	Stewardship Association of Municipalities stewardship agreements	Cedarwood Lane based on Wetland Inventory and/or town survey in CAD (DUC) Western Island Pond Drive Marsh (DUC) Mayflower Drive Large Wetland (WRMD, visit) Existing SAM polygons match NL Land Use Atlas	NL Land Use Atlas: Wildlife
Natural Features	Zone: Watershed	protected water supply	One or the other or both (North Pond and Great Pond)? Both Zones or actual watershed (height of land) boundaries? Use zones, Paola generating latter, Great Pond from engineering firm	Land Use Zones
Natural Features	Zone: Conservation			Land Use Zones
Natural Features	Domestic Cutting Areas	Firewood cutting	Is this in the right category/group?	FFA Domestic Harvest Blocks
Industrial	Zone: Highway Reserve	Torbay Bypass		Land Use Zones
Industrial	Agriculture Development Areas	Provincial agriculture set-asides	Update with province	NL Land Use Atlas: Agriculture
Industrial	Airport proximity noise		NEF > 35	Airport Noise Study
Other	Small isolated regions, mostly around waterbodies	Mostly due to misalignment of Canvec waterbody polygons with constraints/exclusions data above	"Manual" removal using Region Group and Extract by Attributes	N/A
Other	Slivers	Long/narrow slivers attached to larger polygons	"Manual" removal using digitized polygons and Extract by Mask	N/A

Appendix D – Suitability Criteria Table

Group	Group Weight	Criterion	Criterion Weight	Description	Proposed Scoring	Notes/Questions	Dataset(s)
Accessibility	0.25	Proximity to Roads	0.50	Buffer distance to nearest road (m)	Paved 0-1000m = 100-0 Unpaved 0-1000m = 50-0 Other = 0	Include dirt and undeveloped/cleared land from EagleView as gravel roads with lower score	Torbay Centrelines with additional Gravel Roads digitized from EagleView
		Flatness	0.50	Percentage slope	>25% = 0 5%-25% = 100-0 <5% = 100	Decided against outright exclusion of steep areas, instead opting for lower scores	HRDem derivative
Natural Features	0.25	Distance from Wetlands	0.33	From natural assets project	0-1000m = 0-100	Within wetlands boundaries is a constraint/exclusion	DRAFT from work-in-progress via Fundamental Inc. project
		Coastal Setback	0.33	Buffer distance from coastline (m)	Within 30m = 0 (already excluded) 30-100m = 0-100 >100m = 100		Coastline from Land Use Zones
		Flood Avoidance	0.33	Flood Susceptibility Index	Inversion of Susceptibility Index	Coarse data from geo.ca with 0-100 index; continuous but rescaled to 0-100 within Torbay; is there a better source?	NRCan Flood Susceptibility Index and PEC Watershed Flood Limits
Services	0.25	Proximity to Water Servicing	0.33	Buffer distance	0-1000m = 100-0		Torbay as-built lines
		Proximity to Sewer Servicing	0.33	Buffer distance	0-1000m = 100-0		Torbay as-built lines
		Proximity to Amenities	0.33	Buffer distance to schools, retail, clinics, greenspace, etc.	0-Max# within 1km = 0-100	67 amenities digitized from Town POI map and additional sources; used straightline distance	Digitized
Zoning	0.25	Zoning	1.00	Higher suitability	Industrial zones = 0 Otherwise = 100	Commercial General, Commercial Main Street, Comprehensive Development Area - Industrial, Industrial General, Industrial Light, Public Buildings, Town Centre	Land Use Zones

Appendix E – All Suitability Scenario Outputs

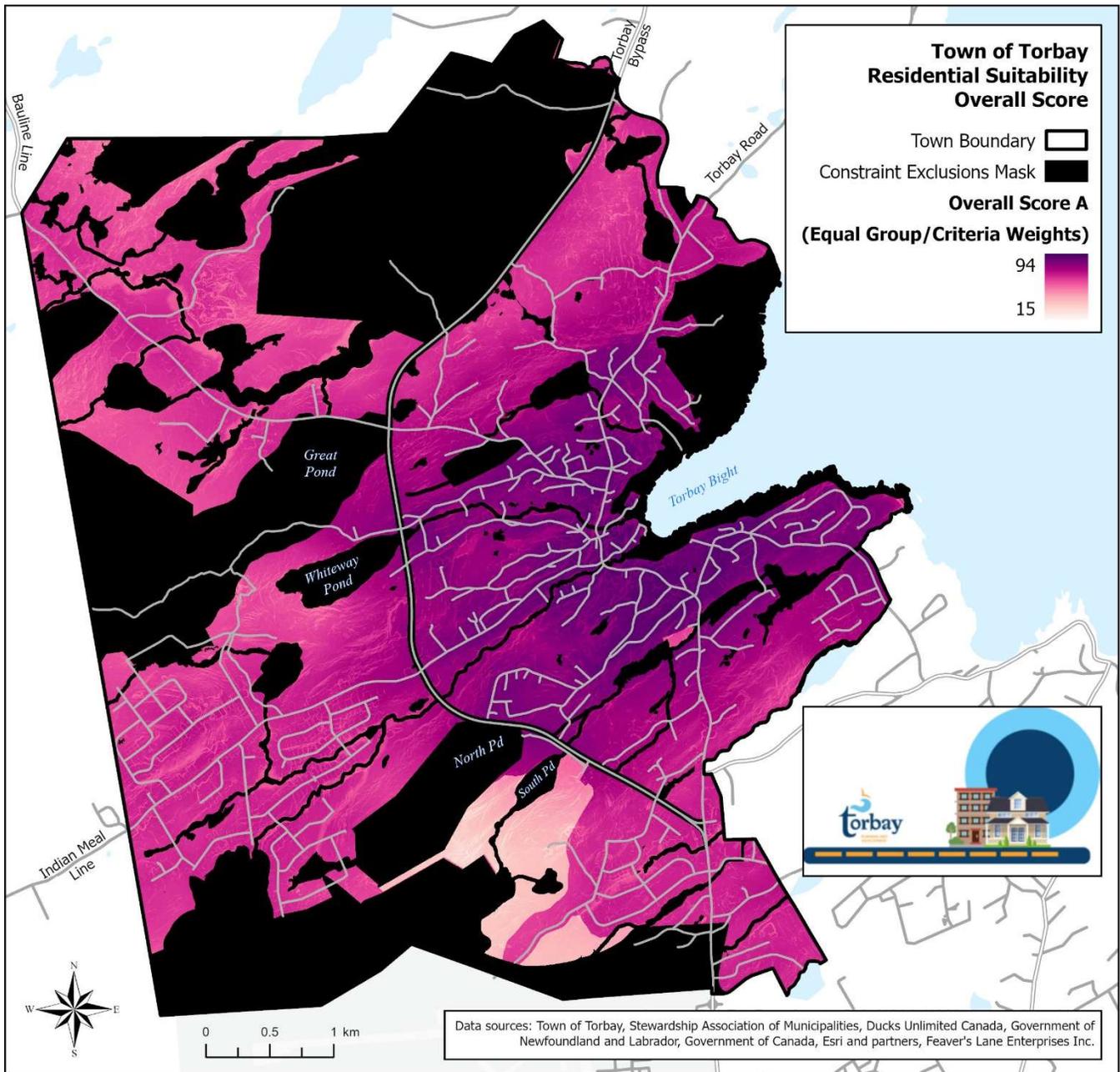


Figure 25 – Map of Overall Residential Suitability Scenario A (equal weights within and across groups)

As in all scenarios, the heart of Town is the most suitable for residential development. Because the industrial areas are in their own group (zoning) with a single criterion, the model used in Scenario A and shown in Figure 25 results in the lowest suitability scores for these areas.

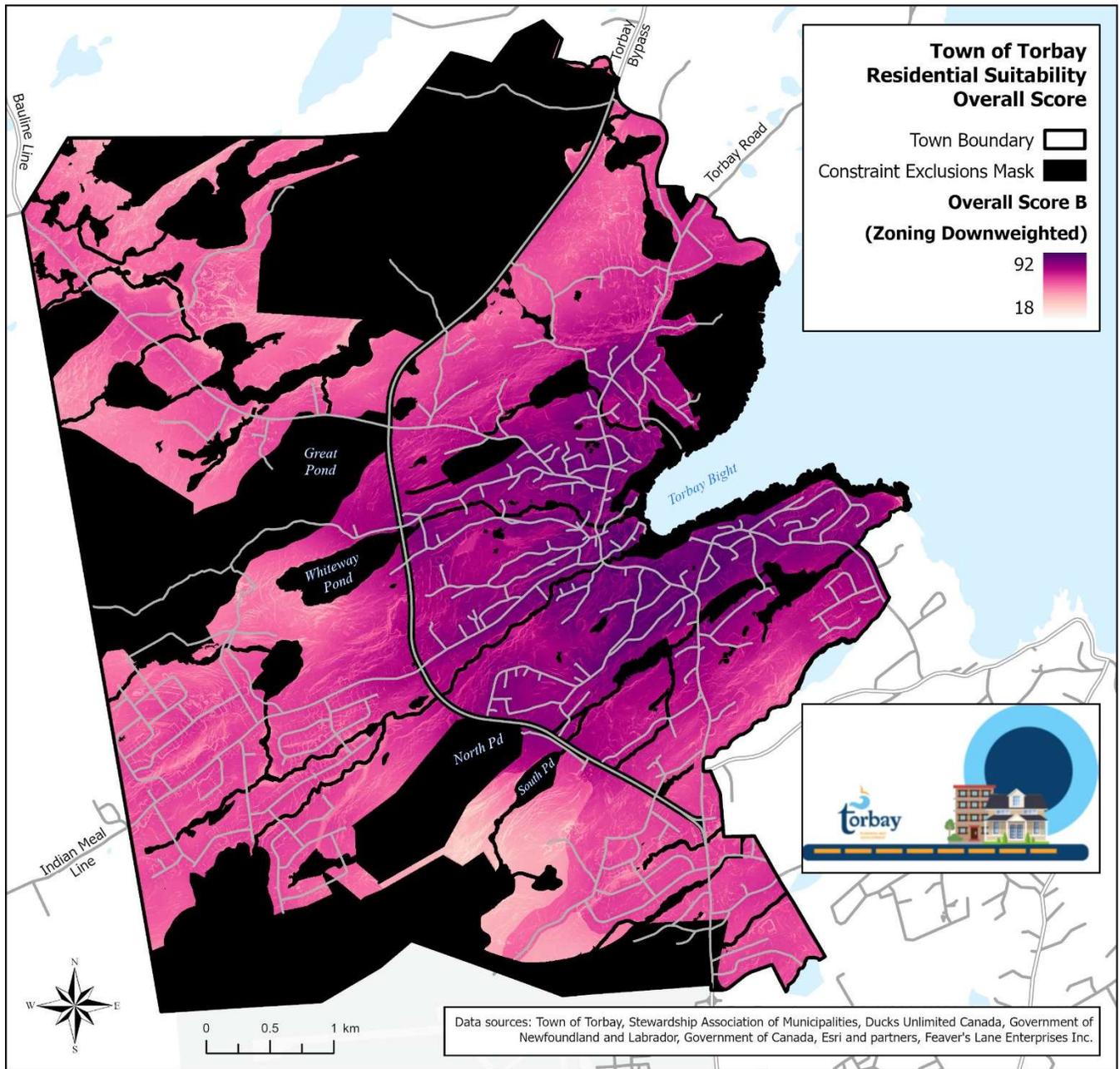


Figure 26 – Map of Overall Residential Suitability Scenario B (zoning downweighted)

In Scenario B shown in Figure 26, areas with industrial zoning still show as unsuitable, but there is more differentiation in all areas of Town of suitability scores based on other criteria groups (Accessibility, Natural Features, Services).

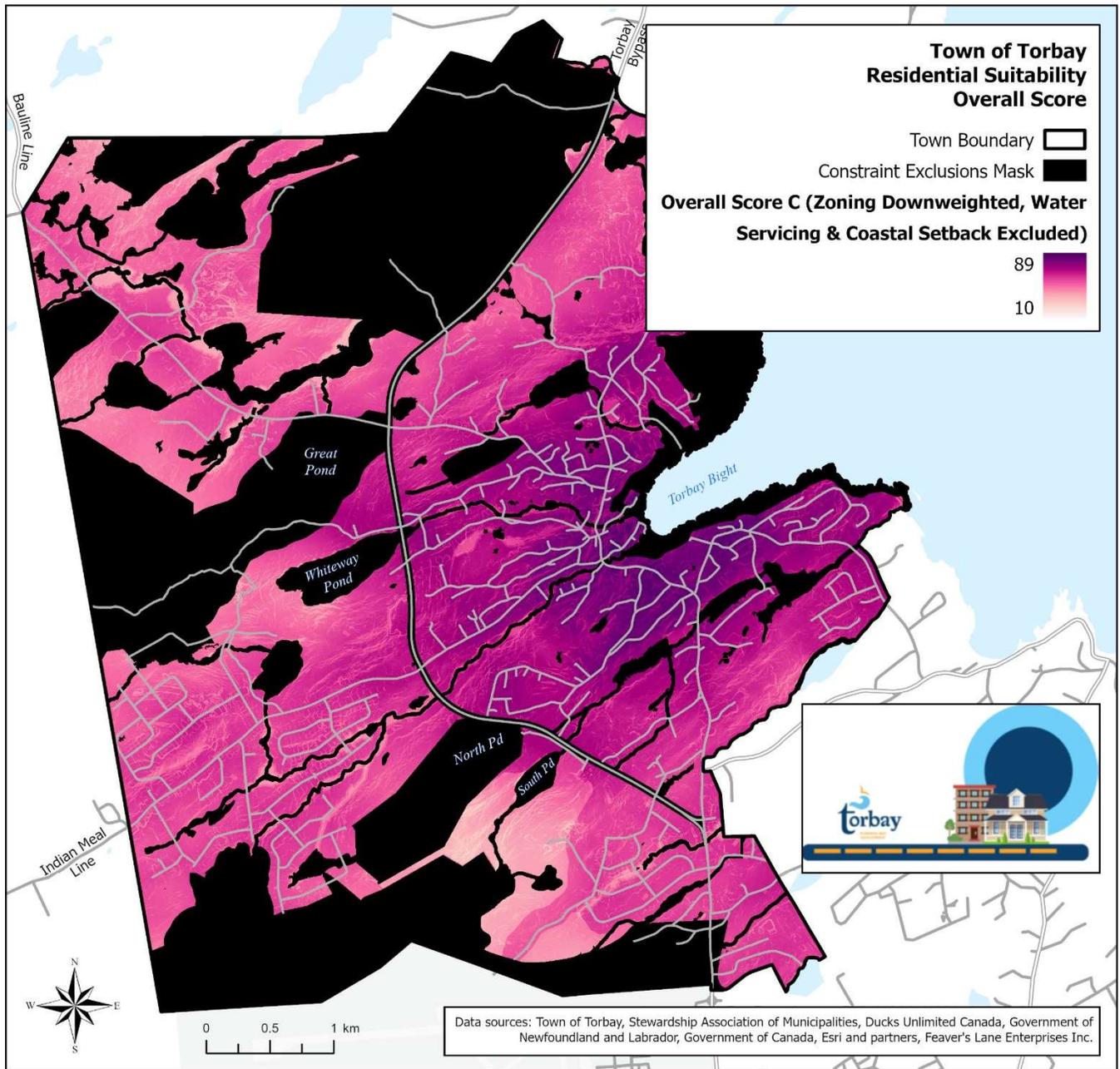


Figure 27 – Map of Overall Residential Suitability Scenario C (zoning downweighted, water servicing & coastal setback excluded)

Scenario C shown in Figure 27 builds on Scenario B by keeping lower industrial weights, but also excluding the somewhat redundant proximity to water servicing and coastal setback criteria as described in the Weighted Sum Scenario Outputs section of the report. This results in the heart of Town around Torbay Bight scoring as slightly less suitable (and other areas slightly relatively more suitable).

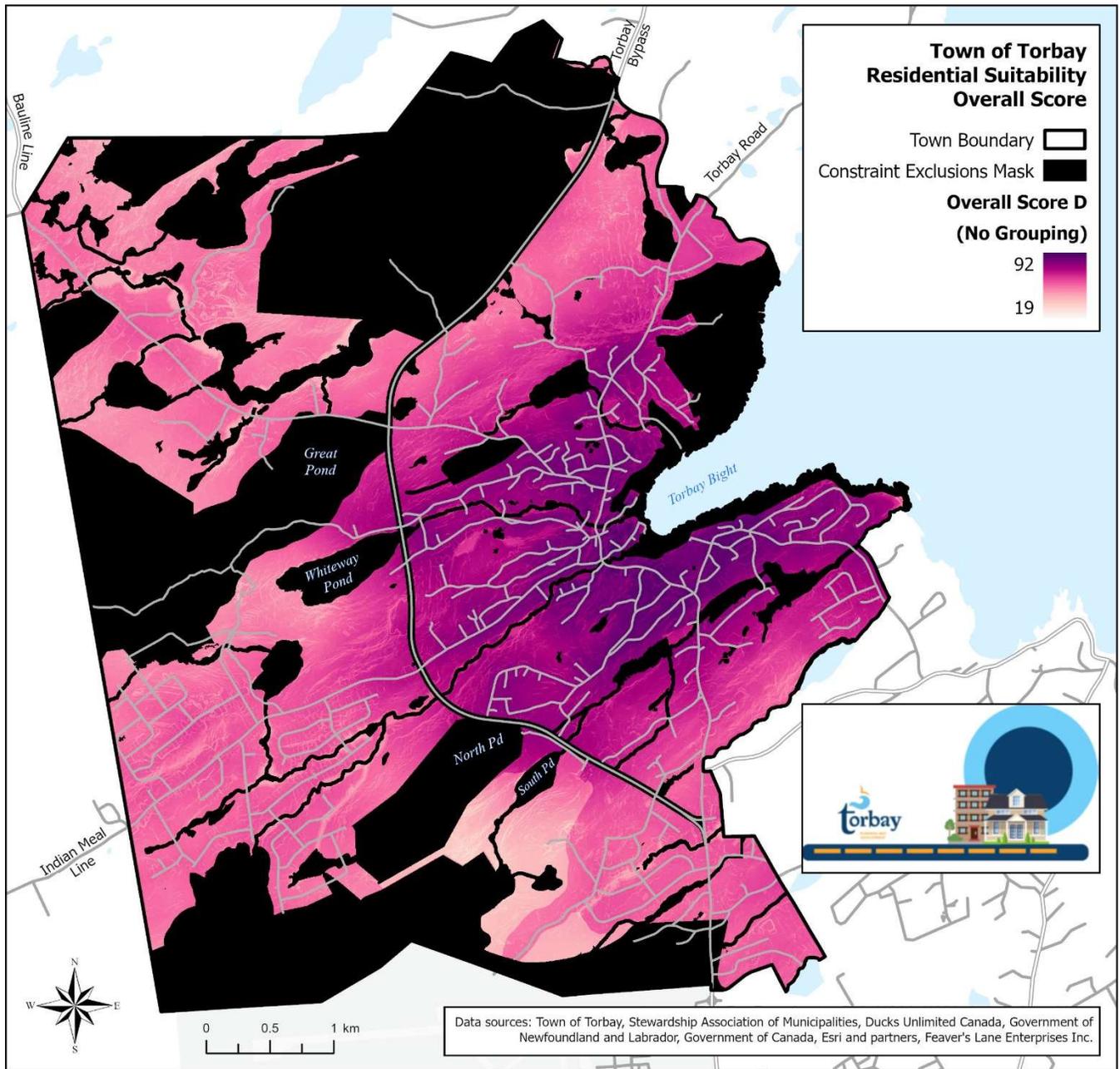


Figure 28 – Map of Overall Residential Suitability Scenario D (no grouping)

In Scenario D shown in Figure 28, giving all criteria equal weights (i.e., not first grouping them) results in slightly lower relative scores for the industrial zones, as well as slightly higher scoring in the heart of Town relative to Scenario C (by reintroducing the excluded criteria). In other areas, relative scoring impacts are minimal if any.

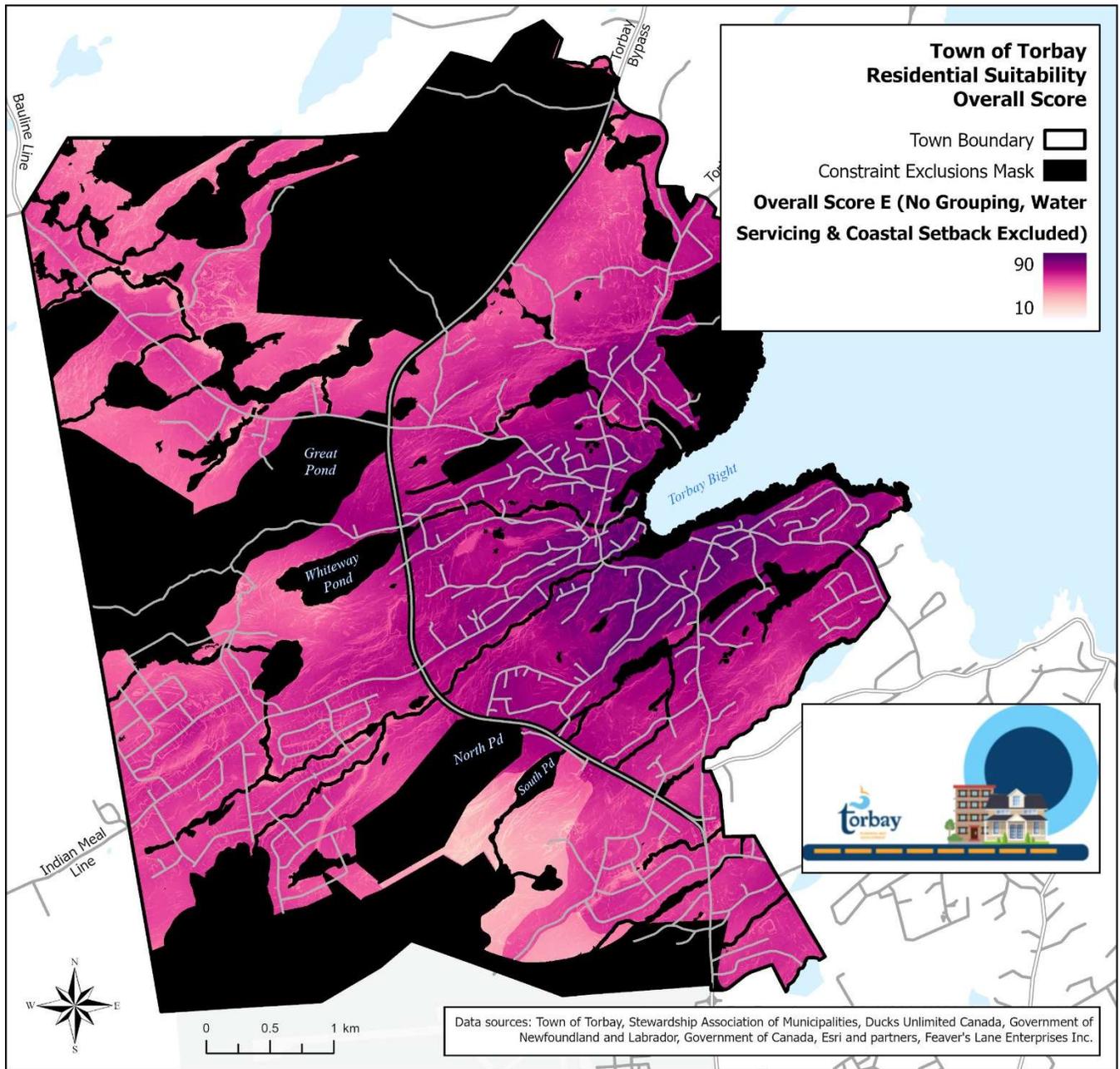


Figure 29 – Map of Overall Residential Suitability Scenario E (no grouping, water servicing & coastal setback excluded)

Because the lack of criteria grouping makes it the easiest to explain and the redundancies (between the coastal setback and conservation exclusions, and between water and sewer servicing criteria) are eliminated, Scenario E is highlighted in the Introduction and Executive Summary and in Figure 17 earlier in this report.

Appendix F – Residential Suitability Methods

Spatial multi-criteria analysis using weighted sum overlay was introduced in the Residential Development Suitability Analysis section above. For a more thorough introduction to the subject please see chapter 2 of Randal Greene’s MSc thesis (Greene, 2010; Greene et al., 2011). The Constraints Analysis section above describes and maps those areas which were excluded from the suitability analysis maps. Note, however, that the weighted sum models were run for the entire Town of Torbay, and the constraints/exclusions were use as a mapping mask only, not as an analysis mask. The following subsections provide additional guidelines on the geoprocessing steps used in ArcGIS Pro 3.5 and 3.6 for the residential suitability analysis.

Assembling data layers that describe the factors of interest:

- Any spatial data that can be converted to relative numeric values/scores is a candidate for use to represent criteria, including numeric indices from existing model outputs and ordinal values like high-medium-low.
- The multi-criteria approach used here is based on raster data, so any polygon layers must be converted to rasters with appropriate pixel values.
- The input rasters should align with the 1m HRDEM elevation layer dtm_1m_mtm1_boundary.tif provided to the Town in the GIS data package. This can be most easily achieved by using that layer for the following geoprocessing environment settings:
 - Cell Size
 - Mask
 - Snap Raster
- If appropriate, run vector or raster geoprocessing tools, such as:
 - Multiple Ring Buffer (for distance/proximity zones with different scores).
 - Distance Accumulation (for continuously increasing or decreasing scores).
 - Topographic surface tools like Slope, Visibility or Viewshed that take elevation values as input.
- Consider adding a Score column to vector polygons and assigning appropriate values before converting to raster.
- Use the Polygon to Raster tool to convert polygon data to raster.
- All raster cells in the study area should have values, so if necessary use the Cell Statistics tool with the maximum or minimum statistic to combine two input layers or set all NoData raster cells to zero or 100.
- Use suitability naming for layers. For example, if closer is more suitable use “proximity to” in the layer’s name; if further is more suitable use “distance from.”
- Of the data sources listed in the Input Criteria section above, the following geoprocessing was required to the prepare the data:
 - Proximity to Roads – based on the Town’s 2025 Eagleview imagery, new roads and roads in progress in areas under development were digitized and all roads categorized as paved or gravel, then the Distance Accumulation tool and value

normalization was run separately for paved (maximum 100) and gravel roads (maximum 50), then combined using the Cell Statistics tool with the maximum statistic.

- Flatness – the Reclassify tool was used to set slope values to scores for each of the slope groups described above in Input Criteria, then combined using the Cell Statistics tool with the maximum statistic.
- Distance from Wetlands – the Distance Accumulation tool was used followed by normalization, then Cell Statistics maximum in combination with the layer BoundaryMask0 to assign a score of zero to the Wetlands themselves.
- Coastal Setback – the Town boundary was converted to a line that clipped to the coast, then the Distance Accumulation tool to a maximum distance of 100 m was used followed by normalization, then Cell Statistics maximum in combination with the layer BoundaryMask100 to assign a score of 100 beyond 100 m of the coast.
- Flood Avoidance – Progressive Engineering polygons were assigned values of 100 for zones around watercourses and 50 for zones further upland then converted using the Polygon to Raster tool, then Cell Statistics maximum was used to combine them with the national coarse-scale flood susceptibility index.
- Proximity to Water Servicing – the Distance Accumulation tool to a maximum distance of 1000 m was used followed by normalization, then Cell Statistics maximum in combination with the layer BoundaryMask0 to assign a score of zero to the remaining areas.
- Proximity to Sewer Servicing – the Distance Accumulation tool to a maximum distance of 1000 m was used followed by normalization, then Cell Statistics maximum in combination with the layer BoundaryMask0 to assign a score of zero to the remaining areas.
- Proximity to Amenities – digitized points were processed using the Buffer tool to a maximum of 1000 m once for Outdoor amenities and once for all others with the former assigned a value of 2 and the latter a value of 1, then the Count Overlapping tool was used to combine them, followed by normalization and Cell Statistics maximum in combination with the layer BoundaryMask0 to assign a score of zero to the remaining areas beyond 1000 m of any amenity.
- Zoning – the Town’s polygons were assigned a value of 0 for Industrial zones and 100 for all other zones, then the Polygon to Raster tool was used.

Normalizing layers to a common scoring scale:

- Options include decimal values between 0.0 and 1.0, or integer values like zero to 10. In this analysis, we use zero to 100, where zero is “totally unsuitable”, one to 99 are levels of increasing suitability, and 100 is “perfectly suitable” with regards to a criterion.
- Options for normalizing input scores that are not already in the chosen range, include:
 - Maximum score normalization, of the form $(\text{input score} / \text{maximum score}) * 100$. The maximum score could be the theoretical maximum or the actual maximum taken from the data.

- Score range normalization, of the form $(\text{input score} / (\text{maximum score} - \text{minimum score})) * 100$. This differs from maximum score normalization in that the lowest values will always score 0.
- Maximum or score range normalization with inversion, which adds a step to invert the scale so that lower input values give higher scores and vice-versa.
- In this analysis, maximum score normalization was applied to convert distances, proximities and slopes to scores in the zero to 100 range.

Running scenarios using weighted sum to combine the layers into a single overall score:

- Always ensure that the weights sum to one (e.g., 0.25 for each of four equally weighted criteria) so that the zero to 100 scoring system described in the previous bullet also applies to the outputs; in other words, an overall score of 100 is “perfectly suitable” on all criteria.
- Use the Raster Calculator tool to perform the calculations.
- The following Raster Calculator formulas were using to calculate the intermediate and outputs in this analysis:
 - $\text{AccessibilityScore2} = \text{Int}((\text{"Proximity to Roads Score"} + \text{"Flatness Score"}) / 2)$
 - $\text{ServicesScore4} = \text{Int}((\text{"Proximity to Water Servicing Score"} + \text{"Proximity to Sewer Servicing Score"} + \text{"Proximity to Amenities Score"}) / 3)$
 - $\text{NaturalFeaturesScore4} = \text{Int}((\text{"Coastal Setback Score"} + \text{"Flood Avoidance Score"} + \text{"Distance from Wetlands Score"}) / 3)$
 - $\text{OverallScore4A} = \text{Int}((\text{"AccessibilityScore2"} + \text{"NaturalFeaturesScore4"} + \text{"ServicesScore4"} + \text{"Zoning Score"}) / 4)$
 - $\text{OverallScore4B} = \text{Int}((\text{"AccessibilityScore2"} * 0.3) + (\text{"NaturalFeaturesScore4"} * 0.3) + (\text{"ServicesScore4"} * 0.3) + (\text{"Zoning Score"} * 0.1))$
 - $\text{NaturalFeaturesScore4C} = \text{Int}((\text{"Flood Avoidance Score"} + \text{"Distance from Wetlands Score"}) / 2)$
 - $\text{ServicesScore4C} = \text{Int}((\text{"Proximity to Sewer Servicing Score"} + \text{"Proximity to Amenities Score"}) / 2)$
 - $\text{OverallScore4C} = \text{Int}((\text{"AccessibilityScore2"} * 0.3) + (\text{"NaturalFeaturesScore4C"} * 0.3) + (\text{"ServicesScore4C"} * 0.3) + (\text{"Zoning Score"} * 0.1))$
 - $\text{OverallScore4D} = \text{Int}((\text{"Coastal Setback Score"} + \text{"Flood Avoidance Score"} + \text{"Distance from Wetlands Score"} + \text{"Proximity to Roads Score"} + \text{"Flatness Score"} + \text{"Proximity to Water Servicing Score"} + \text{"Proximity to Sewer Servicing Score"} + \text{"Proximity to Amenities Score"} + \text{"Zoning Score"}) / 9)$
 - $\text{OverallScore4E} = \text{Int}((\text{"Flood Avoidance Score"} + \text{"Distance from Wetlands Score"} + \text{"Proximity to Roads Score"} + \text{"Flatness Score"} + \text{"Proximity to Sewer Servicing Score"} + \text{"Proximity to Amenities Score"} + \text{"Zoning Score"}) / 7)$

Appendix G – Included Amenity Points

Based on 2024-25 Town of Torbay Tourism Map with additional amenities digitized from Google Maps in 2025.

Name	Outdoor	Name	Outdoor
A Dog's World		Made to Move Physio	
Advantage Signs and Graphic Design		Mary Brown's	
Atlantic Cannabis		Motion Drive Playground	Yes
Atlas Pizza		Newfoundland Vintners	
Big Beach and trailheads	Yes	North Pond Personal Care Home	
Cahill Fabrication		Old Holy Trinity Cemetary	
Caut's Funeral Home		Old St. Nicholas Anglican Cemetary	
Circle K Convenience		Pharma Choice	
Collision Clinic		Pine Ridge Playground	Yes
Cosleys Hill Trailhead	Yes	PJ's Grocetaria	
Designer Autobody		PJ's Pizza	
Dynamic Auto Repair		Platinum Gym	
East Coast Trailhead	Yes	Post Taphouse	
East Coast Trailhead	Yes	Prayer Garden	Yes
East Coast Trailhead	Yes	Public Library	
East Coast Trailhead	Yes	Tails 'N Nails Pet Grooming	
Foodland		Tapper's Cove Wharf	Yes
Furtastic Grooming		Tapper's Gas Bar	
GC Small Engine Repair		Tom Jennings and Tom Gosse Stage	Yes
GW Tax and Accounting		Tony's Collision Centre	
Holy Trinity Church		Torbakery	
Holy Trinity Elementary School		Torbay Common	
Holy Trinity High School		Torbay Common Playground	Yes
Irving Gas		Torbay Fabrics and Gifts	
Island Pond Brook Trailhead	Yes	Torbay History House	
Jack Byrne Arena		Town Hall and Fire Station	
Jones Pond Trail	Yes	Trail's End Convenience	
Juniper Ridge Intermediate		Upper Three Corner Pond Park	Yes
Kinetic Chiropractic		Western Island Pond Playground	Yes
Kryptonian Ink		Western Island Pond Trailhead	Yes
Liddy's Bar / BreakOut NL		Whiteway's Pond Picnic Area	Yes
Liquor Store		Whitty Lane - Swimming Jack Hiking Area	Yes
Lorina's Restaurant		Woodbridge Open Space	Yes
		Woodbridge Park	Yes