PAINTED FOREST CARBON PROJECT

Document Prepared by Ostrom Climate Solutions (Canada) Inc. and Perimeter Forest Limited Partnership

Project title	*Painted Forest Carbon Project*
Project ID	*3812*
Monitoring period	*02-September-2021 to 31-December-2022*
Crediting period	*02 September 2021 to 01 September 2121*
Original date of issue	*28 October 2022*
Most recent date of issue	*31 July 2025*
Version	*5.1*
VCS Standard Version	*v4.7*
Prepared by	*Ostrom Climate Solutions (Canada) Inc. and Perimeter Forest Limited Partnership*

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The Painted Forest Carbon Project creates GHG offsets and forest health benefits through the purchase and conservation of 60,035 ha (148,350 acres) of private forest land, located in the District of Algoma near Sault Ste. Marie, Ontario, Canada. The Project Area (46,000 ha) is in a unique geographic location that will contribute to landscape level forest connectivity between the already established Lake Superior Provincial Park and Algoma Headwaters Provincial Park. The project avoids and removes GHG emissions that would otherwise occur from harvesting the existing forestland. In the project scenario, significant carbon stocks are retained and sequestered through the conservation and continuing growth of the forest, creating substantial net benefits for Ontarians, and providing biodiversity benefits from the conservation and management of the area's forest ecosystem.

The Painted Forest Carbon Project achieves net GHG emission reductions and removals through the avoidance of emissions due to harvesting in the baseline scenario, and by increasing carbon stored by biomass growth.

Prior to the project, the Project Area was being sold privately. The project proponent commissioned an appraisal of the Project Area to assess its value, which was assessed based on the net present value of timber on the Project Area. The value of the Project Area is based on a typical private land management regime. The most likely baseline scenario is a market-driven purchaser who intends to pursue immediate harvest of mature timber stocks to maximize cash value of fibre growing on the Project Area. The baseline scenario involves a harvest of 149,742 m^3 annually in the first 10 sequential years followed by an average annual harvest of 91,407 m^3 for the remaining 90 years in the Project's crediting period. Year 1 (calendar year 2021) is a partial crediting year of 4 months, therefore the harvest in 2021 is 49,909m^3 (1/3 of 149,742).

The project scenario is improved forest management, wherein Perimeter Forest Limited Partnership (Perimeter Forest) undertakes the forest carbon project and associated ecosystem protection and enhancement activities. The project scenario includes an optional low level of timber harvesting as part of forest management activities for the purposes of forest health, incidental infrastructure, ecosystem resilience, biodiversity and other conservation objectives. The project scenario will not exceed 10% of the baseline harvest volume. This represents roughly 0.2% of the total starting inventory volume and does not cause any reduction in the inventory or carbon stocks during the crediting period. Therefore, the project scenario allowable harvest rate does not meet the definition of "Harvest Activity' by the Verra Standard, which is defined as "The harvest of trees, vegetation, or other biomass, which results in a reduction by more than 20% of carbon stocks over a five-year period that starts when a reduction of carbon stocks occurs". This project does not trigger the Long-Term Average.

Perimeter Forest is a proponent of applying technological advancements to forest management and, as such, has funded the development of a high-resolution inventory of the Project Area using remote sensed data (LiDAR and 4band imagery), ground plot sampling, and advanced modelling. The enhanced forest inventory is included in the project plan. Additionally, the traditional permanent sample plot inventory is provided to the verifiers. This project demonstrates the advantages of the inventory approach chosen and will enable the application of remote sensing methodologies to future forest carbon projects in North America.

The project began implementation of activities on the date of acquisition, September 2, 2021, and has continued with project activities to-date. Operations involved cessation of harvest activities on the acquisition date, implementing a permanent plot network in 2022, and developing an enhanced forest resource inventory using LiDAR and satellite imagery. Operational plans going forward involve plot re-measurements in 2024 followed by annual or biennial plot measurements going forward and baseline re-evaluation at minimum every 10 years.

The Painted Forest IFM-LtPF (Improved Forest Management-Logged to Protected Forest) carbon project is forecast to generate approximately 8,171,948 tCO_2e net emissions reductions over 100 years on an ex-ante basis; the crediting period is 100 years. Annual average net emission reductions are projected to be 80,910 tCO_2e annually.

The total net GHG emission reductions generated in the monitoring period (2021 and 2022) is 249,000 tCO_2e.

1.2 Audit History

This is not a crediting period renewal.

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	02-Sept-2021--01-Sept-2121	VCS	Aster Global Environmental Solutions	100[1]
Verification	02-Sept-2021 – 31-Dec-2022	VCS	Aster Global Environmental Solutions	1.33[2]

1.3 Sectoral Scope and Project Type

Sectoral scope	Sector 14: AFOLU

1 Project Proponent has established a Forest Management Plan for the Project which is detailed in Appendix F for the project. This plan does not expire and will be updated at every 5 years (minimum) and is applicable for the project crediting period.

2 This is due to Vintage 2021 being a partial year

AFOLU project category[3]	Improved Forest Management (IFM)
Project activity type	Logged to Protected Forest (LtPF)

1.4 Project Eligibility

1.4.1 General eligibility

The project is eligible to participate in the VCS Program for the following reasons:

- The project type, IFM-LtPF, is an eligible project type under the VCS Program and is not listed as an ineligible project type in the VCS Standard, Section 2.1.
- The project has not been created with the intention to generate GHG emissions primarily for the purpose of their subsequent reduction, removal, or destruction.
- The Project was listed on the Verra Registry in October 2022, within the required three year period of the project start date.
- Validation is underway and projected to be complete within five years of the project start date.
- The opening meeting with the validation/verification body occurred on 7th November 2022.
- The VM0012 methodology is eligible under the VCS Program.

1.4.2 AFOLU project eligibility

This project qualifies as an eligible VCS IFM-LtPF activity because it increases carbon sequestration and reduces GHG emissions on forest lands that were legally managed for wood products in the past. The baseline and project scenarios for the project shall qualify as forests, defined by Natural Resources Canada as geographic areas with similar dominant tree species and stand type, and shall remain forests such as set out in the IPCC 2006 Guidelines on National GHG Inventories. As fee simple private lands, the Project Area qualifies and was historically used for wood product extraction.

The project meets the VCS IFM eligibility requirements outlined in the VCS Standard v4.7[4] as follows:

- The project increases carbon sequestration and/or reduces GHG emissions on forest lands managed for wood products by increasing biomass carbon stocks through improved forest

3 See Appendix 1 of the VCS Standard

4 https://verra.org/documents/vcs-standard-v4-7/

management practices.

- The baseline and the project scenarios both involve activities where forests remain forests. Forest areas are retained as forest after harvest, with no material land conversion other than for forest roads required to support forest management.
- As fee simple private lands, the Project Area is legally approved for wood product management.
- The project meets the VCS LtPF eligibility by converting harvestable forests to conservation forests.

1.4.3 Transfer project eligibility

This is not a transfer project.

1.5 Project Design

☒ Single location or installation

☐ Multiple locations or project activity instances (but not a grouped project)

☐ Grouped project

Grouped project design

This is not a grouped project.

1.6 Project Proponent

Organization name	Perimeter Forest Limited Partnership
Contact person	Mark Balogh, RPF (BC, ON)
Title	Manager of Lands and Carbon
Address	410 Adelaide St West, Suite 220, Toronto, ON, M5V 1S8
Telephone	-
Email	mbalogh@perimeterforest.com

1.7 Other Entities Involved in the Project

Organization name	Ostrom Climate Solutions (Canada) inc.
Role in the project	Project Development Consultant

Contact person	Cornelia Rindt
Title	Director, Domestic Land Use
Address	Floor 4, 322 Water St, Vancouver, BC Canada, V6B 1B6
Telephone	+1 604 646-0400
Email	cornelia.rindt@ostromclimate.com

Organization name	Tesera Systems Ltd.
Role in the project	Enhanced Forest Inventory Developers
Contact person	Michael Kieser
Title	Chief Data Engineer
Address	P.O. Box 91073 RPO, Calgary, AB T3G 5W6
Telephone	+1 (406) 973-3277
Email	michael.kieser@tesera.com

Organization name	McLean Forest Resource Management Inc.
Role in the project	Growth and yield modeling
Contact person	Neil McLean
Title	President
Address	1129 Queen Street East, Sault Ste. Marie, Ontario, P6A 2A2
Telephone	+ 1 (705) 256-9297
Email	neilmclean@mfrmi.com

Organization name	Easern Forest Solutions Inc.
Role in the project	Forest estate baseline/project modelling and carbon quantification
Contact person	Thomas Baglole, RPF (NB)
Title	President

Address	Charlottetown, PE
Telephone	+ 1 (902) 218 2796
Email	Thomas.Baglole@easternforests.ca

Organization name	NorthWinds Environmental Services
Role in the project	Forest Inventory: field plot development
Contact person	Triin Hart
Title	Principal Ecologist
Address	195 Park Ave., Thunder Bay, Ontario, Canada, P7B 1B9
Telephone	+1 807-252-9545
Email	thart@northwindsenv.ca

1.8 Ownership

The Painted Forest Project Area is owned by Perimeter Forest General Partner Inc. (PFGP) on a fee simple basis. The documentation of the sale and of land title will be provided to validators to demonstrate ownership. PFGP is the general partner of Perimeter Forest, who is the project proponent.

1.9 Project Start Date

Project start date	02 September 2021
Justification	The project start date is the date that Perimeter Forest contractually closed the acquisition of the Painted Forest Project Area.

1.10 Project Crediting Period

Crediting period	☐ *Seven years, twice renewable* ☐ *Ten years, fixed* ☒ 100 years

Start and end date of first or fixed crediting period	02 September 2021 to 01 September 2121

1.11 Project Scale and Estimated GHG Emission Reductions or Removals

☒ < 300,000 tCO_2e/year (project)

☐ ≥ 300,000 tCO_2e/year (large project)

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO_2e)
02-September-2021 to 31-December-2021	81,228
01-January-2022 to 31-December-2022	209,728
01-January-2023 to 31-December-2023	190,819
01-January-2024 to 31-December-2024	192,941
01-January-2025 to 31-December-2025	194,289
01-January-2026 to 31-December-2026	201,295
01-January-2027 to 31-December-2027	205,766
01-January-2028 to 31-December-2028	223,956
01-January-2029 to 31-December-2029	246,413
01-January-2030 to 31-December-2030	247,603
01-January-2031 to 31-December-2031	161,286
01-January-2032 to 31-December-2032	156,916
01-January-2033 to 31-December-2033	157,343
01-January-2034 to 31-December-2034	158,863
01-January-2035 to 31-December-2035	158,892
01-January-2036 to 31-December-2036	159,693
01-January-2037 to 31-December-2037	150,994
01-January-2038 to 31-December-2038	153,044
01-January-2039 to 31-December-2039	154,163

01-January-2040 to 31-December-2040	152,063
01-January-2041 to 31-December-2041	162,175
01-January-2042 to 31-December-2042	149,336
01-January-2043 to 31-December-2043	142,860
01-January-2044 to 31-December-2044	137,825
01-January-2045 to 31-December-2045	131,913
01-January-2046 to 31-December-2046	132,064
01-January-2047 to 31-December-2047	129,548
01-January-2048 to 31-December-2048	135,301
01-January-2049 to 31-December-2049	148,909
01-January-2050 to 31-December-2050	145,344
01-January-2051 to 31-December-2051	140,933
01-January-2052 to 31-December-2052	135,267
01-January-2053 to 31-December-2053	131,475
01-January-2054 to 31-December-2054	128,115
01-January-2055 to 31-December-2055	125,287
01-January-2056 to 31-December-2056	123,681
01-January-2057 to 31-December-2057	114,053
01-January-2058 to 31-December-2058	112,612
01-January-2059 to 31-December-2059	108,643
01-January-2060 to 31-December-2060	105,547
01-January-2061 to 31-December-2061	99,832
01-January-2062 to 31-December-2062	86,849
01-January-2063 to 31-December-2063	90,419
01-January-2064 to 31-December-2064	89,873
01-January-2065 to 31-December-2065	85,292
01-January-2066 to 31-December-2066	70,651
01-January-2067 to 31-December-2067	50,985
01-January-2068 to 31-December-2068	63,799

01-January-2069 to 31-December-2069	96,027
01-January-2070 to 31-December-2070	94,381
01-January-2071 to 31-December-2071	96,013
01-January-2072 to 31-December-2072	54,279
01-January-2073 to 31-December-2073	38,847
01-January-2074 to 31-December-2074	34,112
01-January-2075 to 31-December-2075	36,313
01-January-2076 to 31-December-2076	30,231
01-January-2077 to 31-December-2077	28,862
01-January-2078 to 31-December-2078	29,642
01-January-2079 to 31-December-2079	25,556
01-January-2080 to 31-December-2080	22,896
01-January-2081 to 31-December-2081	57,399
01-January-2082 to 31-December-2082	83,544
01-January-2083 to 31-December-2083	82,897
01-January-2084 to 31-December-2084	80,966
01-January-2085 to 31-December-2085	76,836
01-January-2086 to 31-December-2086	56,862
01-January-2087 to 31-December-2087	34,413
01-January-2088 to 31-December-2088	38,804
01-January-2089 to 31-December-2089	40,541
01-January-2090 to 31-December-2090	41,811
01-January-2091 to 31-December-2091	42,873
01-January-2092 to 31-December-2092	49,957
01-January-2093 to 31-December-2093	39,253
01-January-2094 to 31-December-2094	55,692
01-January-2095 to 31-December-2095	50,994
01-January-2096 to 31-December-2096	27,504
01-January-2097 to 31-December-2097	42,906

01-January-2098 to 31-December-2098	50,264
01-January-2099 to 31-December-2099	32,380
01-January-2100 to 31-December-2100	34,755
01-January-2101 to 31-December-2101	29,290
01-January-2102 to 31-December-2102	26,304
01-January-2103 to 31-December-2103	25,921
01-January-2104 to 31-December-2104	18,189
01-January-2105 to 31-December-2105	30,333
01-January-2106 to 31-December-2106	47,396
01-January-2107 to 31-December-2107	45,115
01-January-2108 to 31-December-2108	53,834
01-January-2109 to 31-December-2109	50,049
01-January-2110 to 31-December-2110	49,232
01-January-2111 to 31-December-2111	46,724
01-January-2112 to 31-December-2112	49,589
01-January-2113 to 31-December-2113	55,630
01-January-2114 to 31-December-2114	74,558
01-January-2115 to 31-December-2115	67,050
01-January-2116 to 31-December-2116	64,030
01-January-2117 to 31-December-2117	65,204
01-January-2118 to 31-December-2118	64,067
01-January-2119 to 31-December-2119	70,397
01-January-2120 to 31-December-2120	68,032
01-January-2121 to 01-September-2121	66,410
Total estimated ERRs during the first or fixed crediting period	**9,511,051**
Total number of years	**100**
Average annual ERRs	**94,169**

1.12 Description of the Project Activity

The Painted Forest project will generate net GHG emission reductions and increase carbon sequestration in forest biomass by reducing the allowable harvest outlined in the baseline scenario. Project activities are designed to be integrated with all property management plans outlined in Perimeter Forest's Forest Management Plan (Appendix C).

Future stand-level management activities could include small-scale timber harvesting, and thinning, biodiversity enhancement activities, access management, and other forest health management as necessary (never to exceed 10% of the baseline harvest volume). Direct carbon benefits of this continued small-scale timber harvesting and thinning include fire and pest risk mitigation, and improved forest productivity and ecosystem resilience. Co-benefits of these activities include sustainable improvements in forest habitat, forest transitioning to old-growth characteristics, and biodiversity and ecosystem resilience, and ongoing employment opportunities for local contractors and community members.

The project is not located in a jurisdiction covered by a REDD+ program.

1.13 Project Location

The Painted Forest Project Area is located in north-central Ontario, Canada, in the District of Algoma; approximately 80 kilometres north of the city of Sault Ste. Marie and 30 kilometres east of Lake Superior (Figure 1). It measures 46,000 ha (113,668 acres) of timberland and is a non-contiguous block, split diagonally by the Watco Rail corridor in a northwest-southeast direction, bordered on the north side by the Montreal River (Figure 2).

The approximate centre location latitude and longitude coordinates of the property are 47.187006°, -84.252531°.

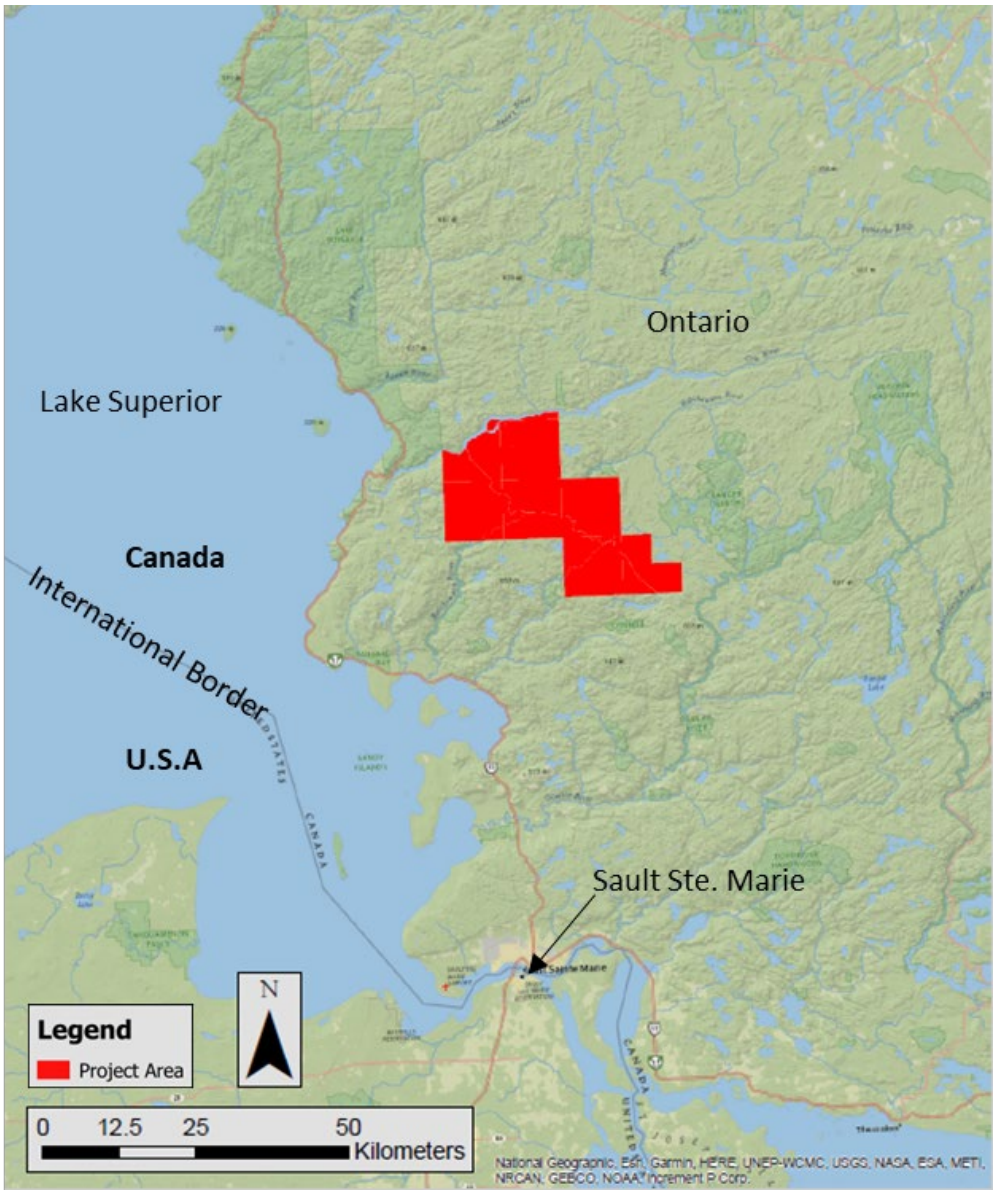

Figure 1. Regional Location of the Painted Forest Project Area

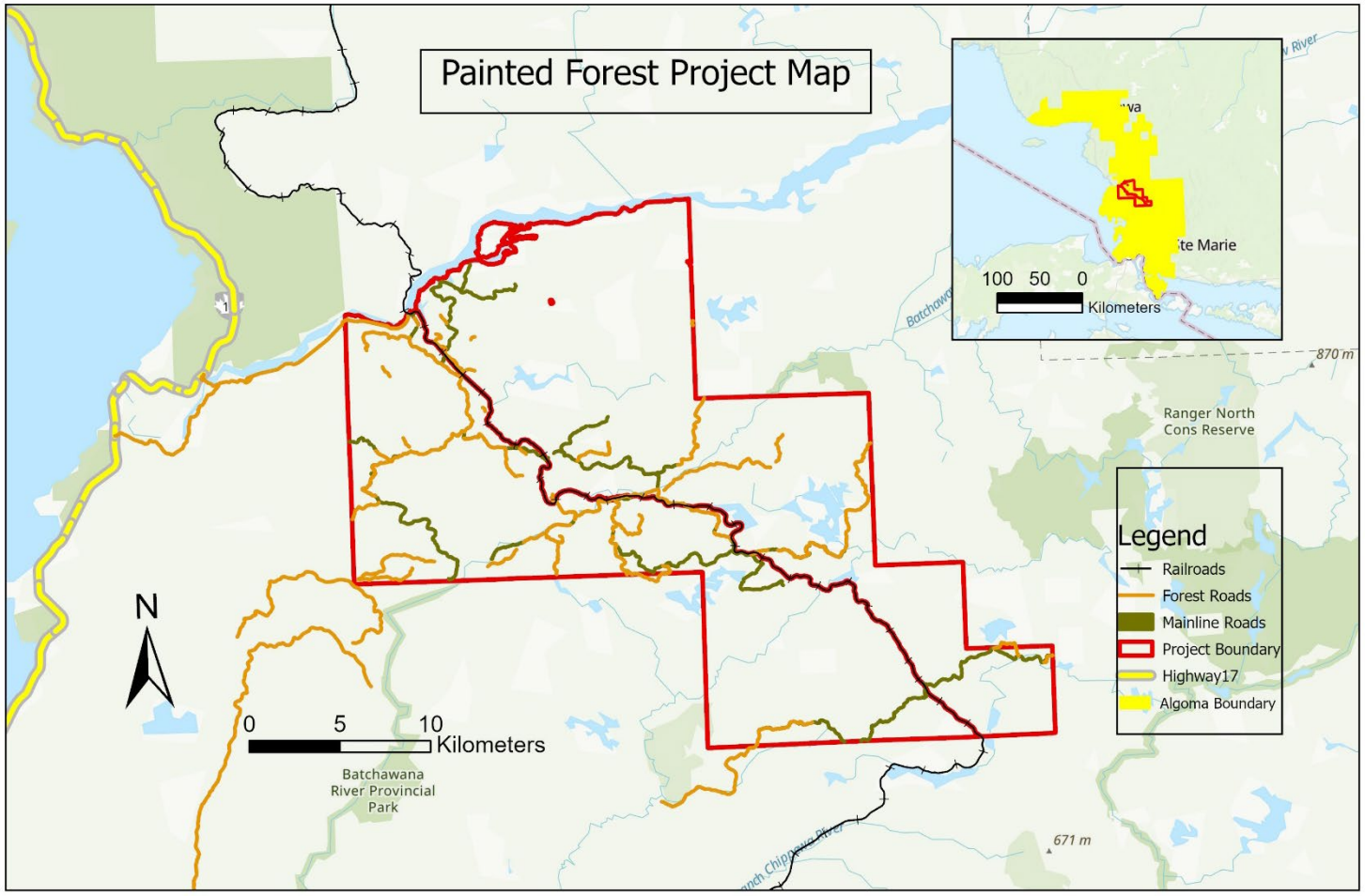

Figure 2. Painted Forest Project Area external boundary, Watco Rail corridor intersecting the Project Area, and local road networks within.

The Project Area consists of 9 townships: Davieaux, Vibert, Tronsen, Tolmonen, Raaflaub in their entirety, and portions of Desbiens, Loach, Larson and Home. The Project Area can be accessed by five points of access, through public road systems (Figure 2). Four of these access points are through the TransCanada HWY 17, north of Sault Ste. Marie, and one is off HWY 532 from the town of Searchmont. The Project Area can also be accessed via the Watco railway, passing through each township, which intersects the Project Area in a northwest-southeast orientation. The railway corridor is owned by Watco Rail Services, and is not part of the Project Area. Harvest operations on the Project Area have utilized three freight sidings along the Watco rail line to bring timber to market.

Three main waterways flow through the Project Area: the Chippewa, Batchawana and Montreal Rivers. There are also several lakes on the Project Area.

1.14 Conditions Prior to Project Initiation

Ecosystem Type

The Project Area is located within Ecodistrict 5E-13 (Batchawana Ecodistrict) which supports a diverse array of plants representative of the temperate and boreal vegetation zones. Temperature, precipitation, and humidity differences occur across the ecodistrict due to topographic variability and the proximity to Lake Superior. The Ecodistrict is characterized by deciduous forests that are dominated by sugar maple and contains an abundance of rare and threatened species. Major river valleys in the area were shaped by glacial meltwaters. The dominant substrate of the ecodistrict is Precambrian bedrock, mostly granite and gneiss, which is overlain by shallow acidic mineral material.

Ownership History

Historically, the Algoma Central Railway was awarded the townships north of Sault Ste. Marie in the late 1800s and conducted timbering operations on the land into the mid-20th century. In 1995, the land was sold to McDonald Investments, who utilized the land for commercial timber harvesting with harvest rates reaching approximately 150,000m^3/yr. In 2005 the Project Area sold to Algoma Timberlakes Corporation (ATC). ATC originally planned to continue harvesting the land at the previous rates, but the global recession limited cutting operations to 168,000 m^3 over their 8 years of ownership (21,000 m^3/yr) allowing for an accumulation of merchantable timber volume of 1,032,000 m^3 based on McDonald rates. The Project Area was then purchased by Quercus Algoma Corporation in 2014. Commercial timber harvesting was restarted with management plans harvesting 70,000 m^3/year and ratcheting up to approximately 150,000

m^3/year by 2020 to capture the unrealized volume from previous years (supporting documentation provided to VVB).

Climate

The Project Area is located in the Ontario Shield Ecozone, and the Georgian Bay Ecoregion, and experiences a cool-temperate and humid climate. It is characterised by humid and cool weather, with annual precipitation between 771 to 1,134 mm/year[5]; the wettest months being September and November and the mean summer rainfall between 204 and 304 mm. Mean annual temperatures range from 2.8 to 6.2 °C. Winters are cold, but milder than some inland areas due to heat from Lake Superior. The mean growing season length is 183-219 days.

Hydrology

There are three main waterways that flow through the Property and drain into Lake Superior, namely the Chippewa River, the Batchawana River and the Montreal River on the north boundary. The property is bordered on the north by the Montreal River, which delineates the general boundary between northern hardwood and the transition to boreal forest types. The property is bisected by the southwesterly flowing Batchawana River, as well as by the southeast to northwest route of the Algoma Central Railroad right-of-way, effectively creating four quadrants of the property. The property contains numerous lakes, several of which are over 100 acres (40 ha) in surface area[6].

Soil

The Project Area sits on the Precambrian Shield where the soils have been less intensively mapped than Southern Ontario. Acid granites and Gneisses have weathered to produce course-to-medium sands with very low base content. Tills derived from such materials contain enough silt to be classified as sandy loam, but with a clay content so low that the term silty sand is more appropriate. Base rich Precambrian rocks such as basalt and metamorphic rocks such as amphibolite have base contents higher than granites but still much lower than limestone. These are still considered to be low-based materials. Over most of the Canadian Shield the layer of unconsolidated drift is less than three metres deep, but it is deeper in the moulded till ridges

5 https://www.ontario.ca/page/ecosystems-ontario-part-1-ecozones-and-ecoregions

6 Appendix C - PF Painted Management Plan 2024.pdf

and drumlinord landforms. Clay deposits within the Precambrian Shield are derived from Paleozoic deposits transported from areas from the Canadian Shield[7]

Topography

The Batchawana area is comparatively rugged with a mean elevation above sea level of 365 meters or 1200 feet. Some of the steeper hills and ridges are caused by large diabase dykes and/or felsic intrusions. They rise in some cases 150 meters or nearly 500 feet above surrounding terrain. Where the underlying rocks are sedimentary, terrain varies from hummocky to swampy. Where the terrain is comparatively rugged, drainage is correspondingly fast but most of the small creeks are narrow and not difficult to cross on foot. The Montreal and Batchawana Rivers are prone to very steep rocky bluffs which rise 150 meters above the river level[8].

Regional Land Cover

The regional Algoma Forest, a designated crown sustainable forest license area, encompasses an area of 1,565,141 ha, of which approximately 47% is unencumbered Crown land eligible for management, 9% is protected in parks or conservation reserves, 35% is held under private patent, 2% is held as federal reserve land or under some other special designation, and 7% is water[9]. The Algoma Forest region consists of 33.0% mixed forest, 12.1% coniferous forest, and 22.2% deciduous forest and is part of the Great Lakes – St. Lawrence forest region.

Notable Species

Several species of note have been identified within the Project Area, according to the Threatened and Endangered Species Evaluation conducted by Geo-Source Inc.[10], and are itemised in the Threatened and Endangered Species section below. No other endemic or specialist species are known on the Project Area.

7 Appendix C - PF Painted Management Plan 2024.pdf

8 Appendix C - PF Painted Management Plan 2024.pdf

9 https://nrip.mnr.gov.on.ca/s/published-submission?language=en_US&recordId=a0z3g000000CdqjAAC

10 Geo-Source, Inc. Threatened and Endangered Species Evaluation, Algoma Property. 147,882 +/- Acres of Timberlands, Algoma District, Ontario, Canada. January 2014.

Threatened and Endangered Species

A review of Threatened and Endangered Species on and around the Painted Forest Project Area was carried out by Geo-Source Inc. in January 2014. The following findings are of species with known occurrences in the Project Area.

- Birds: Peregrine Falcon (*Falco peregrinus*), sighting in northern Home Township, known nesting north and outside of the Project Area along the Montreal River. They are a Species of Special Concern in Ontario.
- Species at Risk (note: species unspecified due to confidentiality/risk to species) has an Area of Concern (AOC) in the southwestern portion of the Project Area, identifying this area as a High Conservation Value Forest (HCVF). This habitat qualifies as designated Species at Risk habitat according to the Ontario Endangered Species Act (2007). This species is an Endangered Species in Ontario and Threatened Species in Canada.
- Myotis bat species are likely in the Project Area and will be managed according to Perimeter Forest's bat management guidelines. Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis (*Myotis septentrionalis*) are Endangered Species in Ontario.

Land Use

Commercial forestry is the predominant land use in the region, along with outdoor recreation, hunting, trapping, and fishing (supported document provided to VVB). As mentioned in Section 3.4, the Painted Forest was previously owned by an institutional investor that purchased the property in 2014 and placed the property up for sale in 2021. During their ownership term, vendor's management focused on timberland property development – this involved enhancing the value of the timberland property for timber harvest purposes, with upgrades and establishment of a new road network to gain access to the highest value timber reserves. Vendor spent $8 million in road improvements over 5 years to provide interior access to timber and access to rail sidings. The property was under Sustainable Forestry Initiative (SFI) certification during the vendor's tenure, with an SFI approved management plan. The management plan was updated in 2020 and stipulated a forward-looking annual allowable cut (AAC). The property was then purchased in 2021 by Perimeter Forest General Partner Inc.

There are 211 recreational leases on the property outside of the Project Area, mostly waterfront, and one trapper cabin lease.

There are also nine commercial leases in the Project Area, eight storage leases, as well as one industrial lease with a hydroelectric operator on the Montreal River.

The Project Area is within the Algoma Forest which either surrounds or is adjacent to 35 Provincial Parks and conservation areas and one National Park. Provincial Parks near the property include Lake Superior, Batchawana River (abuts the Project Area north and south), and Algoma Headwaters. The forest types and their acreages in the operable forested area of the Project Area are outlined below in Table 1. The most common forest types in the Project Area are tolerant hardwood (dominated by hard (sugar) and soft (red) maples and yellow birch, with white spruce, balsam fir and white pine mixed throughout the stands). Shade intolerant hardwoods are mostly trembling aspen and/or white birch and tend to be on lower ground mixed with spruce/fir types. The spruce/fir type contains a mix of spruce species and balsam fir along with shade intolerant hardwoods (aspen, white birch) and other species including red maple. Mixed wood describes a common mix of spruce/fir and intolerant hardwood (generally spruce, fir, aspen, and white birch). Lowland conifer stands are mostly black spruce, with northern white-cedar and larch mixed in. Stands dominated by cedar are present, but less common.

Table 1. Operable Forested Area Summary[11]

Forest Unit	Hectares	% Total
Tolerant Hardwoods	20,637	45%
Intolerant Hardwoods	386	<1%
Conifer	10,521	23%
Mixed woods	14,456	31%

11 HRIS inventory (Appendix J)

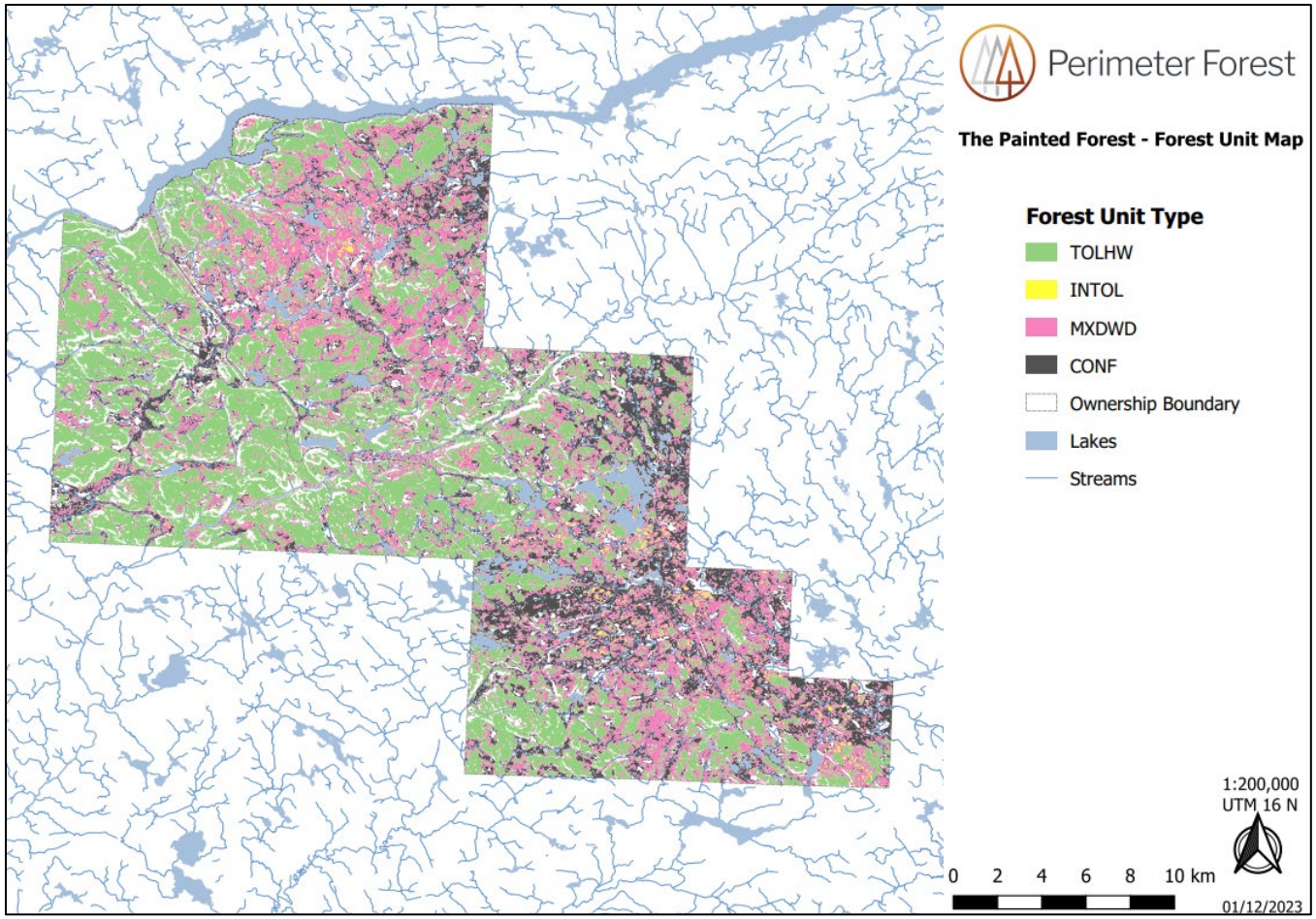

Figure 3. Map illustrating the Forest Unit distribution across the Project Area: Tolerant Hardwoods (TOLHW), Intolerant Hardwoods (INTOL), Mixed Wood (MXDWD), Conifer (CONF).

Social

Several Indigenous communities reside in the Algoma region in proximity to the Painted Forest Project Area, including:

- Batchewana First Nation;
- Missanabie Cree First Nation;
- Michipicoten First Nation;
- Garden River First Nation; and
- The Métis Nation of Ontario Historic Sault Council.

1.15 Compliance with Laws, Statutes and Other Regulatory Frameworks

This forest carbon project is designed to comply with Canadian and Ontario laws, statutes, and regulations, in both the baseline and project scenarios. The Painted Forest project is focused on conserving forest ecosystems and habitat, and is therefore inherently compliant with provincial, federal, and local laws and regulations. The Painted Forest is managed by experienced forestry managers who ensure compliance with relevant laws and regulations, including the advice of Ontario Registered Professional Foresters when required.

The project has established the baseline scenario to be fully compliant with applicable laws and regulations in Ontario. Any project scenario activities will be undertaken with the advice or oversight of an Ontario Registered Professional Forester in compliance with any relevant laws and regulations. Some of the key legislation is listed below.

Provincial Laws, Statutes, and Regulations

- ***The Planning Act*** **(1990) –** Ontario Ministry of Municipal Affairs and Housing
    - **Relevant Section**: 1.1.6.1: Territory Without Municipal Organization
    - **Purpose:** On rural lands located in territory without municipal organization, the focus of development activity shall be related to the sustainable management or use of resources and resource-based recreational uses (including recreational dwellings).
    - **Details**: The Painted Forest Carbon Project Area is located on lands without municipal organization, and the focus in development in the project scenario is sustainable management of the Project Area.
    - **Relevance to Baseline/Project Scenario:** both project and baseline scenario involve sustainable forest management and not development activities.
- ***Lakes and Rivers Improvement Act*** **(1990) –** Ministry of Natural Resources and Forestry and Fisheries and Oceans Canada: Protocol for the review and approval of forestry water crossings
    - **Purpose**: Among other things, the Ontario approved water crossing standards outlines guidelines for areas such as erosion and sediment control, fish and fish habitat, and construction and maintenance. These standards must be implemented consistently with

applicable and approved Forest Management Plans and must be overseen by trained individuals.

- **Details**: The stream crossings within the Project Area boundary will adhere to the approved water crossing standards for the Province of Ontario.
- **Relevance to Baseline/Project Scenario:** the project scenario activities adhere to the requirements of the act and the baseline scenario is designed to be implementable within the act. The project scenario does not include new road construction that could require stream crossings.

- *Professional Foresters Act* (2000) – Statutes of Ontario
  - **Purpose:** This legislation regulates the scope of practice of professional forestry within the Province of Ontario.
  - **Relevance to Baseline/Project Scenario:** the project activities voluntarily rely on professional foresters to make forest management decisions on private lands**.** The baseline scenario is designed by professional foresters and involves practices deemed sustainable and common practice by professional foresters.
- *Clean Water Act* (2006) – Statutes of Ontario
  - **Purpose**: To protect the province's existing and future sources of drinking water.
  - **Relevance to Baseline/Project Scenario**: both project and baseline scenario activities protect sources of drinking water through riparian buffers. The project scenario furthers this protection with increased buffer widths.
- *Endangered Species Act* (2007) – Statutes of Ontario
  - **Purpose**: Among other things, the Act is the province's legislative commitment to the protection of species at risk and their habitat.
  - **Details**: The project has had a Threatened and Endangered Species Evaluation performed by Geo-Source Inc. Environmental Consultants and has management guidelines for relevant species in the Project Area.
  - **Relevance to Baseline/Project Scenario:** both the project and baseline scenarios involve activities that would adhere to this act and the reduced harvest nature of the project scenario will contribute to additional habitat protection.
- *Managed Forest Tax Incentive Program (2012)* – Ontario Ministry of Natural Resources
  - **Purpose**: Landowners who get their property classified as "Managed Forest" pay 25% municipal residential property tax rate, by following a 10-year Managed Forest Plan, approved by a Managed Forest Plan Approver, and must submit a 5-year progress report, and update the plan every 10 years to stay in the program.

- **Relevance to Baseline/Project Scenario:** The project is voluntarily registered as managed forest land for tax assessment purposes. This program has no operation impact on the baseline or project scenarios.

- *Municipal Act* (2001) – Statutes of Ontario
  - **Purpose**: The Act gives municipalities broad powers to pass bylaws and govern within their jurisdiction. The Act also outlines requirements for municipalities including practices and procedures. accountability and transparency.
  - **Relevance to Baseline/Project Scenario:** there are no municipal bylaws related to forest activity that impact baseline and project scenario.

Federal Laws, Statutes, and Regulations

- *Species at Risk Act (2002)* – Statutes of Canada
  - **Purpose:** the purpose of the act is to provide for the legal protection of wildlife species and the conservation of their biological diversity. The act prevents wildlife species from becoming extinct and secures the necessary actions for their recovery.
  - **Relevance to Baseline/Project Scenario:** both project and baseline scenarios involve activities that would adhere to this act and the reduced harvest nature of the project will contribute to additional habitat protection.

- *Fisheries Act (1985)* – Revised Statutes of Canada
  - **Purpose:** The purpose of this Act is to provide a framework for the proper management and control of fisheries; and the conservation and protection of fish and fish habitat, including preventing pollution.
  - **Relevance to Baseline/Project Scenario:** both project and baseline scenarios involve activities that would protect fish and fish habitat through riparian buffers. The project scenario furthers this protection with increased buffer widths.

- *Migratory Birds Convention Act (1994)* – Statutes of Canada
  - **Purpose**: The purpose of this Act is to implement the Convention by protecting and conserving migratory birds — as populations and individual birds — and their nests.
  - **Relevance to Baseline/Project Scenario**: both project and baseline scenarios involve activities that would adhere to this act and the reduced harvest nature of the project will contribute to habitat protection.

- *Canadian Navigable Waters Act (1985)* – Revised Statutes of Canada
  - **Purpose**: *The Canadian Navigable Waters Act* regulates works and obstructions that risk interfering with navigation in navigable waters. It also prohibits the dumping of fill that risk impacting navigation in navigable waters and the dewatering of navigable waters.
  - **Relevance to Baseline/Project Scenario:** both project and baseline scenarios involve activities that would protect navigable waters through riparian buffers. The project scenario furthers this protection with increased buffer widths and a reduction in harvest operations.

Local Laws, Statutes and Regulations

There are no laws, statutes and regulations pertaining to this private land.

Other Certifications and Registrations

- Sustainable Forestry Initiative (SFI)
  - **Purpose:** Promotes sustainable forestry based on 13 Principles, 17 Objectives, 41 Performance Measures and 114 Indicators. These requirements include measures to protect water quality, biodiversity, wildlife habitat, threatened and endangered species, and Forests with Exceptional Conservation Value. Private landowners that are certified to the SFI standards are expected to follow Best Management Practice guidelines outlined in the SFI: Best Management Practices for Forest Operations in Northern Ontario and Manitoba for Private Landowners and Logging Contractors.
  - **Details**: The Project Area was certified to this standard by the previous owners.
  - **Relevance to Baseline/Project Scenario:** The baseline common practice scenario considered the SFI certification BMPs of the previous property owners.

- Forest Stewardship Council (FSC)
  - **Purpose:** FSC forest management certification confirms that the forest is being managed in a way that preserves biological diversity and benefits the lives of local people and workers, while ensuring it sustains economic viability. FSC has introduced an additional procedure to demonstrate and communicate about the positive impact of responsible forest management on ecosystem services.
  - **Details**: The Project Proponent has been assessed and certified as meeting the requirements of the FSC National Forest Stewardship Standard of Canada Forest Stewardship Standard (FSC-STD-CAN-01-2018 ENG). FSC Licence Code 'FSC-C187530' applies to the project area and all forest properties owned by the proponent.
  - **Relevance to Baseline/Project Scenario:** The project has been voluntarily certified to the FSC national standard. This program has no operational impact on the baseline or project scenarios.

- Ontario Professional Foresters Association
  - **Purpose:** An organization committed to actively contributing to sustainable forest management by assuring the highest professional standards of practice in forestry.
  - **Details:** The Project Area is managed by a Registered Professional Forester (RPF) in Ontario, under this Association.
  - **Relevance to Baseline/Project Scenario:** the project has made the voluntary decision to rely on professional foresters to make forest management decisions on private lands. The baseline scenario is defined based on forestry practices considered sustainable and common practice by a Registered Professional Forester.

1.16 Double Counting and Participation under Other GHG Programs

1.16.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

1.16.2 Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

1.16.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

1.17 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.17.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit?

☐ Yes ☒ No

1.17.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system?

☐ Yes ☒ No

1.17.3 Supply Chain (Scope 3) Emissions

Do the project activities specified in Section 1.12 affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

If yes: N/A

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

If yes: N/A

Has the project proponent(s) or authorized representative posted a public statement on their website saying, “Carbon credits may be issued through Verified Carbon Standard project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities].”

☐ Yes ☒ No

1.18 Sustainable Development Contributions

1.18.1 Sustainable Development Contributions Activity Description

Table 3 outlines how the project activities align with and contribute towards the United Nations Sustainable Development Goals.

Table 2 identifies how the project contributes to achieving and is in alignment with the sustainable development activities outlined in Canada's Federal Sustainable Development Strategy[12] (FSDS), under the Federal Sustainable Development Act (2008)[13]:

Table 2. Alignment of the project with Canada's Federal Sustainable Development Strategy.

FSDS Goal	Theme	Implementation strategy/ Target/ Short-term milestone	Project Alignment	Quantification
4: Promote knowledge and skills for sustainable development	Research and knowledge sharing	Promote environmental knowledge and data sharing	The project information is publicly available, offering significant information on the area and project site. Perimeter Forest has also engaged in a memorandum of understanding with a local Ontario college for supply of project data and hosting students for in-field education.	• The project's information becoming publicly available increases Canadian's access to information about environmental knowledge. https://perimeterforest.com/nature-projects/painted-forest-carbon-project/. • MOU (provided to the VVB) demonstrates that local students attending the college will have access to environmental knowledge and data through Perimeter Forest's sharing of project data.
6: Ensure clean and safe water for all Canadians	Healthy lakes and rivers	Restoration and protection of lakes and rivers	The logged-to-protected nature of the project will maintain intact forest which will reduce soil erosion and act to regulate hydrological processes resulting in protected riparian zones and ensuring clean water without sedimentation from machinery intensively crossing waterbodies within the Project Area.	• A voluntary 30m no harvest buffer on streams and lakes beyond 3 meter minimum. Increased riparian buffers reduce impacts on water quality[14]. • The logged-to-protected nature of this project will retire secondary roads and halt major new road construction reducing impacts on water quality.
8: Encourage inclusive and sustainable economic	Support for workers and businesses	Train and re-skill workers	The majority of the entities involved in project development are Canadian-based, and the 100-year crediting period chosen for the project ensures a sustainable source of revenue for the	• As forest carbon is a new industry in Canada, every additional project contributes to the country's body of work and diversifies the skills of Canadian workers within the natural resource sector.

12 https://www.fsds-sfdd.ca/

13 https://laws-lois.justice.gc.ca/eng/acts/F-8.6/page-1.html#h-240644

14 Shah, N. et. Al. The effects of forest management on water quality. (2022). Forest Ecology and Management. Volume 522. 120397.

growth in Canada			Canadian-based project proponent.	• The Project Area is used by a local sustainable mushroom harvesting company. Carbon measurement field work has supported the training of Indigenous youth in the environmental and forestry fields. Canadian forest carbon projects – of which there are currently nine[15] [16] [17] [18] [19] [20] [21] [22] [23] – account for less than 1% of Canada's managed forest land (215 million ha) • Diversification of the current Canadian economy and creating new opportunities
9: Foster innovation and support green infrastructure in Canada	Green infrastructure and innovation	Develop knowledge of clean technologies	The project's inclusion of the innovative High Resolution Inventory Solution (HRIS), a LiDAR area-based model from Tesera Systems, is pioneering and anticipated to set a precedent for future projects. The HRIS inventory is publicly available through the Perimeter Forest website. https://perimeter.tesera.com/app/	• The project's inclusion of the innovative HRIS allows for reduced field visitation and required travel, lessening impacts associated with field work. This innovation supports continual monitoring to detect areas of change across the Project Area and the subsequent updates to the HRIS inventory.

15 BigCoast Forest Climate Initiative: https://registry.verra.org/app/projectDetail/VCS/3018

16 Monet Forest Conservation Project: https://registry.verra.org/app/projectDetail/VCS/2322

17 Quebec Forestry Sector Carbon Sequestration Grouped Project Pivot: https://registry.verra.org/app/projectDetail/VCS/1916

18 Darkwoods Forest Carbon Project: https://registry.verra.org/app/projectDetail/VCS/607

19 Cheakamus Community Forest Carbon Project: https://carbonregistry.gov.bc.ca/br-reg/public/bc/project.jsp?project_id=104000000026363

20 Quadra Island Forestland Conservation Project: https://carbonregistry.gov.bc.ca/br-reg/public/bc/project.jsp?project_id=104000000011410

21 The Great Bear (Haida Gwaii) Forest Carbon Project: https://carbonregistry.gov.bc.ca/br-reg/public/bc/project.jsp?project_id=104000000011559

22 The Great Bear (North and Central-Mid Coast) Forest Carbon Project: https://carbonregistry.gov.bc.ca/br-reg/public/bc/project.jsp?project_id=104000000012798

23 Great Bear (South Central Coast) Forest Carbon Project: https://carbonregistry.gov.bc.ca/br-reg/public/bc/project.jsp?project_id=104000000011319

11: Improve access to transportation, parks, and green spaces, as well as support cultural heritage in Canada	Green spaces, cultural and natural heritage	Promote access to green space, cultural and natural heritage	The Project Area's Forest and waterbodies are accessible and available for gentle recreational use by the general public, as well as culturally for local Indigenous groups. Also, the land was the focus of over 100 documented paintings by the iconic Group of Seven artists.	• Access to green space (80km from Sault Ste. Marie) • Increased number of people in the area will be made aware of the access to this green space and given opportunity to visit. • Perimeter Forest is choosing to voluntarily integrate information on the historical painting sites into its management plans to foster stewardship and retention of these historical landmarks and are working with Gary McGuffin, a local Group of Seven researcher who identified these sites to promote the conservation of this cultural heritage resource. https://perimeterforest.com/nature-projects/painted-forest-carbon-project/. Perimeter Forest will consult with Gary McGuffin prior to any timber harvest.
13: Take action on climate change and its impacts	Climate change mitigation and adaptation	Greenhouse gas emissions	The project generates carbon emission reductions, the prime purpose of which is to address climate change and its impacts.	• Approximately 8,171,948 tCO_2e emissions reductions over 100 years on an ex-ante basis; the crediting period is 100 years.
15: Protect and recover species, conserve Canadian biodiversity	Conservation of land and freshwater, Species protection and recovery	Sustainable forests, Terrestrial ecosystem conservation, Species at risk	The logged-to-protected nature of this project will create new forests with old growth characteristics and preserves and improves upon existing habitats and its associated biodiversity, including the threatened and endangered species identified in this document. The Project Area is at the most northern extent of distribution of an unnamed (confidential) Species at Risk in Canada and represents one of the most intact ecosystems for the species in the country.	• 60,035 hectares protected. • Lake trout restoration project in the Project Area in collaboration with the local Ministry of Natural Resources and Forestry (MNR) • A voluntary 500 m no harvest buffer has been implemented for our project based on the full extent of the current unnamed (confidential) Species at Risk habitat identified by the local MNR. The Species at Risk management protocols in the Perimeter Forest management plan have been informed by the MNR. Regional Species at Risk

				specialists will be consulted on how to best manage this habitat and further refine the area of concern.

1.18.2 Sustainable Development Contributions Activity Monitoring

Table 3 outlines the project activities implemented during this monitoring period and how they align with and contribute towards the United Nations Sustainable Development Goals. See Appendix U for SDG indicator contribution evidence.

The SD contributions described in Table 3 that also contribute towards Canada's Federal Sustainable Development Strategy are as follows:

SDG Indicator 6.6 – Logged-to-protected project results in protected riparian zones. Contributes to FSDS Goal 6.

SDG Indicator 9 – Use of Lidar to develop an enhanced forest inventory. Contributes to FSDS 9.

SDG Indicator 13.0 - Reduction in harvest contributes to a net reduction in greenhouse gas emissions in the atmosphere. Contributes to FSDS Goal 13.

SDG Indicator 15.1.1 - Harvest volume reductions contribute to a forested environment and reduced deforestation. Contributes to FSDS Goal 15.

SDG Indicator 15.1.2 - Reduction in harvest conserves and enhances the quality and volume of habitat for terrestrial and freshwater species. Contributes to FSDS Goal 15.

SDG Indicator 15.2.1 - Progress towards sustainable forest management. Contributes to FSDS Goal 15.

SDG Indicator 15.5 - Reductions in the degradation of natural habitats protect and prevent the extinction of threatened species. Contributes to FSDS Goal 15.

Table 3: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	9.0	Industrial, Innovation and Infrastructure	The project includes an innovative deviation from the VM0012 methodology through the creation and utilization of an enhanced FRI, which is informed by field, Lidar, and 4-Band imagery data.	During this first monitoring period, the project was established and validated to include the development of an innovative Lidar and 4Band imagery informed High Resolution Inventory System (HRIS)	Continued use of this improving HRIS technology.

2)	6.6	Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	The logged-to-protected nature of the project results in protected riparian zones, ensuring clean water bodies within the site.	Riparian zones have been undisturbed since the project start date, as no timber harvesting has occurred during the project period. It has been established during this monitoring period that no harvest will occur within 30m of riparian zones during the project period, unless it is specifically designed for biodiversity enhancement based on prescriptions from a professional ecologist and is designed to not negatively impact riparian areas.	Continued protection of riparian zone within the project area over the project lifetime.
3)	13.0	Tonnes of greenhouse gas emissions avoided or removed	The creation of the carbon project and its reduction in harvest on the project property contributes to a net reduction in greenhouse gas emissions in the atmosphere.	Net emission reductions achieved by the project in this monitoring period: **2021 = 69,530 tCO_2e** **2022 = 179,470 tCO_2e**	Net emission reductions achieved by the project over the project lifetime to date = **249,000 tCO_2e**

4)	15.1.1	Forest area as a proportion of total land area	The project reduces the harvest volume on the property by a minimum of 90% compared to the baseline scenario, resulting in a continuation of a forested environment and reduction in the loss of productive land harvest activities (roads, landings etc).	During this monitoring period, there has been no harvest, and no loss of productive land.	To date, there has been no harvest activity; thus no change in forest areas as a proportion of total land area.
5)	15.1.2	Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	The following threatened or endangered species, or species of concern, are known to occur within the property: - Peregrine Falcon (*Falco peregrinus*), - Unnamed (confidential) Species at Risk - Myotis bat species The changes to and reduction in harvest activities associated with the project activity conserves and enhances the quality and volume of habitat for these species.	During this monitoring period, there has been no harvest activity on the property, providing undisturbed and naturally regenerating habitat conditions. It has been established in this monitoring period that a 500m voluntary no harvest buffer on identified confidential Species at Risk habitat has been adopted, as well as a Bat Management Protocol in Perimeter Forest's Forest Management Plan which has been adhered to during this monitoring period and all times.	To date, there has been no harvest activity; thus providing undisturbed and naturally regenerating habitat conditions.

6)	15.2.1	Progress towards sustainable forest management	The project activity includes a sustainable management approach to harvesting on the property, with Allowable Annual Harvest being lower than the sustainable yield of the property.	During this monitoring period, there has been no harvest, reducing the harvest of wood compared to the baseline scenario.	Forgone timber harvest (relative to baseline scenario) has preserved timber within the forest.
7)	15.5	Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species – see Red List Index	The changes to and reduction in harvest activities associated with the project activity conserves and enhances the quality and volume of habitat and biodiversity, including the species listed in 15.1.2 above.	During this monitoring period, there has been no harvest activity on the property, providing undisturbed and naturally regenerating habitat conditions	To date, there has been no harvest activity; thus providing undisturbed and naturally regenerating habitat conditions.

1.19 Additional Information Relevant to the Project

Leakage Management

The market leakage factor is estimated to be 15.30% using the VM0012 Market Leakage Option 3 – Leakage Assessment Tool. Leakage is assessed from publicly available data from the forest wood products market, which is used to identify where leakage risk is most likely to be leaked to (or replaced from). This allows for a more detailed assessment of leakage (compared to other options) for its weighing into different biomass areas, and to separate domestic versus international leakage proportions. The leakage assessment is provided in "VM0012_Workbook_Painted_FINAL_12_16_2024.xlsx".

There is no negative activity shifting leakage risk for the Project Area as the proponent is not involved in commercial harvesting on any other forest properties.

Commercially Sensitive Information

The primary contents of this publicly available project description document are not considered confidential. However, elements of reference materials and supporting source data are deemed confidential, including that of financial models, (eFRI), and details of property acquisition. Any isolated areas of text that are deemed confidential are blacked out in the public version of this document and identified as confidential.

Appendix B is confidential, as is Appendix C.

Further Information

No further relevant information.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	Perimeter Forest conducted a thorough assessment of potential stakeholders that could be impacted by reducing the timber harvest on the property (the project activity). Potential stakeholders were first identified by conducting a review of the previous owner's Sustainable Forestry Initiative (SFI) stakeholder list, which was made available to the VVB. In addition, Perimeter Forest reached out to the Ontario Ministry of Natural Resources (MNR) to obtain contact information for Indigenous communities that the MNR indicated may have an interest in Perimeter Forest's management activities on the property. Perimeter Forest also conducted a brainstorming exercise to identify other potential stakeholders. This included brainstorming to identify and classify User Groups that belong in one of the following three categories: **Residents -** includes any individuals that live within the project area or broader property. **Regular Users –** includes individuals that are known to frequent the property in one or more seasons and on an annual basis or otherwise have leasehold interests or private property interest embedded within or located on the project property. **Intermittent Users** - identified any intermittent users of the property that do not live on the property or undertake business and/or livelihoods on the property. During Perimeter Forest's brainstorming exercise, it was concluded that contractors (e.g., logging & road work contractors) should not be considered potential stakeholders. Contractors, by definition, are engaged intermittently and do not solely depend on the property for their livelihoods. Furthermore, because they are intermittent users that are engaged through individual contracts put out for competitive bid, the pool of potential contractors and those actually working on the property vary across time. Contractors not engaged on the project area due to the project activities would invariably shift

operations elsewhere. The VCS Standard indicates that "distant or intermittent user groups who will be affected in limited ways by the project need not be defined as stakeholders." Based on the description above, we conclude that since individual contractors are both intermittent users and will be affected in limited ways by the project (i.e., as a matter of course, they shift work to where it is available), contractors do not need to be defined as stakeholders.

The process of brainstorming for Residents, Regular Users, and Intermittent Users resulted in Identified Users as follows:

Residents

No individuals live within the project area or property

Regular Users

Leaseholders (camp and commercial)

Private landowner (with land embedding within the property)

Intermittent Users

General public

First Nations

Businesses

The VCS Stakeholder Identification and Assessment document contains a list of identified users on the property, and this document has been provided to the VVB. Each of these potential stakeholders were evaluated against the definition of stakeholder in the VCS Program Definitions, where the term "stakeholder" refers to any person or entity who can potentially affect or be affected by the project activities. We began by assessing whether any of the potential stakeholders could affect the project activity, and subsequently determined whether any potential stakeholders could be affected by the project activity. A potential stakeholder that can neither affect nor be affected by the project activity was deemed to not be a stakeholder.

	Step 1: Assessment of Rights by Potential Stakeholders that Can Affect the Project Activities See legal or customary tenure/access rights section below. **Step 2: Assessment of Potential Users that Can Be Affected by the Project Activities** Perimeter Forest undertook an assessment to determine whether any user can be affected by the project activities (i.e., the reduction of timber harvest). The VCS Stakeholder Identification and Assessment document discusses the results of this assessment. The assessment incorporates an assessment of impact level as outlined in the VCS, whereby "distant or intermittent user groups who will be affected in limited ways by the project need not be defined as stakeholders." Based on Step 2 assessment, there were no users identified as affected by the project activities. **Conclusion & Overall Assessment of Identified Stakeholders** As per the VCS Program Definitions, the term "stakeholder" refers to any person or entity who can potentially affect or be affected by the project activities. Since there are no entities that can affect or be affected by the project activities, within the scope of the VCS, the project has no stakeholders. As per the VCS Program Definitions, "interested stakeholders comprise any person, group of persons or entity that has shown an interest, in the activities of the project but that will not be materially affected by those activities." A number of interested stakeholders exist for the project.
Legal or customary tenure/access rights	The Project Area is fee-simple land and Perimeter Forest is the legal owner of the land and has all surface and subsurface rights. Perimeter Forest has the rights to the timber as there are no timber reserves or encumbrances on the property[24]. There are leaseholders on the property however, they only have rights to their leased land and the leasehold areas have been excluded from the Project Area.

24 Land title documents are provided to the VVB

The Project Area is located within the Robinson Treaty area.

Legal review indicates that no Aboriginal title claims have been made on the property. Furthermore, with respect to Indigenous rights, any cases of land claims fall within the jurisdiction of the Crown (Federal Government of Canada) on both public and private lands (duty to consult). As part of the proponent's FSC certification on the property, Perimeter Forest has reached out to the five Indigenous communities that the MNR indicated may have an interest in forest management activities on the property. Perimeter Forest has and continues to engage with nations who have responded to initial communication request regarding the project including potential collaboration and job opportunities (information related to communications are held in the Communication Tracker provided directly to VVB). There are no archaeological or historical sites identified under the Ontario Heritage Act on the property.

Mining Rights – There is a Mining Rights Option Agreement on the property which expires in 2037. This agreement governs any potential future mining development on the property. Perimeter Forest Limited Partnership (PFLP) as the subsequent owner of the property has now full and unfettered control over any potential mining development on the Painted Forest property as per the Mining Rights Option Agreement.

There are no Rights held by potential stakeholders identified as being able to affect the project (Step 1 above).

Renewable Energy Rights – There is an active Wind Power Lease Option Agreement on the property which expires in [XXXX]. This Agreement governs any potential future wind power development on the property. A Letter of Commitment from the Wind Power Developer outlining their access and usage rights, along with GHG and ecosystem safeguards, has been supplied to the VVB. Subject to the outcome of a feasibility assessment carried out during the term of the Agreement, the Wind Power Developer retains the right to exercise a Surface Lease. If the Wind Power Developer elects to exercise a Surface Lease, the Project Proponent will act in accordance with *Section 3.21 Project Description Deviations (VCS Standard v4.7)*. A Letter of Commitment from the PFLP to Verra, dated April 1, 2025, outline's Perimeter's commitment to promptly undertake these Project actions.

For the avoidance of doubt, PFLP will retain full and unfettered control over all forest assets within the Project during the term of the Agreement. The Wind Power Developer is not permitted to clear or convert forest land under the Agreement and PFLP has supplied

	VERRA with a Letter of Commitment *outlining a conservative VCU issuance schedule that mitigates any residual risk of excess VCU issuance from unplanned clearing or land conversion.*
Stakeholder diversity and changes over time	As per VCS definition of stakeholder and interested stakeholder, there are only interested stakeholders identified in this Project.
Expected changes in well-being	As per VCS definition of stakeholder and interested stakeholder, there are only interested stakeholders identified in this Project.
Location of stakeholders	As per VCS definition of stakeholder and interested stakeholder, there are only interested stakeholders identified in this Project.
Location of resources	Not applicable

2.1.2 Stakeholder Consultation and Ongoing Communication

Date of stakeholder consultation	As per Section 2.1.1 there are only Interested Stakeholders, and not Stakeholders as defined by VCS Standard.
Stakeholder engagement process	Not applicable
Consultation outcome	Not applicable
Ongoing communication	Not applicable, however, ongoing communication will occur with Interested stakeholders (leaseholders, local Indigenous Nations and other stakeholders) with project updates and information. Communications will be via formal letters, emails and updates on the local Facebook page. Any interested stakeholder can get in touch with Perimeter Forest by visiting the company website and reaching out on the "Contact Us" page (https://www.perimeterforest.com/contact-us/).
Stakeholder input	Not applicable

2.1.3 Free Prior and Informed Consent

Obtaining consent	As per Section 2.1.1. there are only Interested Stakeholders, and not Stakeholders as defined by VCS Standard. As such, FPIC is not required.
Outcome of FPIC	Not applicable

2.1.4 Grievance Redress Procedure

Development process	Not applicable.
Grievance redress procedure	While there are no stakeholders identified in this project, as per VCS standard definitions, Perimeter Forest is committed to addressing complaints or disputes in a timely and ethical manner during their regular business administration. Anyone can get in touch with Perimeter Forest by visiting the company website and reaching out on the "Contact Us" page (https://www.perimeterforest.com/contact-us/).

Grievances received	Resolution and outcome
Not Applicable	Not Applicable

2.1.5 Public Comments

Comments received	Actions taken
20 November 2022: "Can't understand the values presented in Table 10. Differences between the baseline and the project scenarios don't match in size with the estimated net GHG reduction. How to access to the calculation sheets? Thanks"	At the time of comment, the PD was not complete. This has been addressed through completion of the PD and carbon quantifications.
19 November 2022: "this is really great"	No action required

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

Organization	Name	Expertise	Experience
Perimeter Forest Limited Partnership	Daniel Andres	Daniel holds a Bachelor of Science in Biology/Biological Sciences from Trent University and a Master of Science in Ecology and Evolutionary Biology from the University of Calgary.	Daniel holds the position of Chief of Climate & Biodiversity Operations at Perimeter Forest Limited Partnership. As an ecologist, Daniel's role with Perimeter Forest focuses on the environmental aspects of land acquisition and management, including serving as the lead for carbon credit and other nature credit developments. Daniel also works with the members of the team and consultants to ensure that the management plans enhance the ecological function and biodiversity of the forestland assets.
Perimeter Forest Limited Partnership	Mark Balogh	Mark holds an advanced diploma in Integrated Resource Management, Bachelor of Arts in Geography and Mapping, and a Bachelor of Science in Forestry with a minor in Operations.	Mark holds the position of Manager of Lands and Carbon at Perimeter Forest Limited Partnership. Mark is a Registered Professional Forester in British Columbia and Ontario and is the forestry lead for land assets and carbon developments. Mark has 15 years of forestry experience in the northern interior of BC and the Algoma and Temiskaming regions of Ontario. Beyond carbon projects, Mark oversees forest management plans, silviculture prescriptions, inventories, internal and external audits, and asset management under forest certification and carbon credit programs.
Eastern Forests	Thomas Baglole	Thomas holds a Bachelor of Science in Forestry from the University of New Brunswick	Thomas is the President and Founder of Eastern Forests. Thomas focuses on leading the technical components of forest carbon development by focusing on strategies for generating high-quality carbon projects based on sound science and

			monetizing partners forest carbon to support forest restoration and stewardship initiatives.
Ostrom Climate	Cornelia Rindt	Cornelia holds a Bachelor of Science in Biology from the University of Victoria, and a Master of Science in Environment and Management from Royal Roads University	Cornelia is the Director of Domestic Land Use at Ostrom and responsible for managing the development of forest and other land use carbon offset projects within Canada. She has been developing land use carbon offset projects since 2004 and now oversees the development of Projects from project design through to validation and verification. She has worked with many different compliance and voluntary standards including BC's Forest Carbon Offset Protocol, Verra's Verified Carbon Standard, the American Carbon Registry and California's Air Resources Board. Cornelia managed the Great Bear Forest Carbon Projects from 2009 to 2021 which has generated over 8 million verified carbon offsets sold into the carbon markets and generated significant revenues for the First Nations communities

2.2.2 Risk Assessment

	Risks identified	Mitigation or preventative measure taken
Natural and human-induced risks to stakeholders' wellbeing	No Stakeholders have been identified as per the VCS Standard	No mitigation or preventative measures required.
Risks to stakeholder participation	No Stakeholders have been identified as per the VCS Standard	No mitigation or preventative measures required.
Working conditions	No Stakeholders have been identified as per the VCS Standard	No mitigation or preventative measures required.

Safety of women and girls	No Stakeholders have been identified as per the VCS Standard	No mitigation or preventative measures required.
Safety of minority and marginalized groups, including children	No Stakeholders have been identified as per the VCS Standard	No mitigation or preventative measures required.
Pollutants (air, noise, discharges to water, generation of waste, release of hazardous materials)	Risk of pollution in waterways from soil erosion, slash and use of chemicals as a result of forestry practices.	The project activities significantly reduce harvest activity in the Project Area, and harvests may only be undertaken for wildfire mitigation, biodiversity enhancements, and forest health reasons. Perimeter Forest and its contractors will adhere to Ontario's *Occupational Health and Safety Act* and *Federal Fisheries Act* for any use of chemicals in forestry or road maintenance activities, although for clarity, no use of chemicals is planned for these purposes. Contractors operating in the Project Area are required to adhere to applicable laws and regulations and have protocols in place for safe handling of fuels (e.g., gasoline, diesel), spill response kits, and are required to report any incidents of release of these fuels. Spill reporting procedures are outlined in the Perimeter Forest Health and Safety policy and FMP (see Appendix C).

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

Risks identified[25]	Mitigation or preventative measure(s) taken
Discrimination	Perimeter Forest recognises and adheres to the laws and legislation surrounding human rights in Ontario and Canada. Perimeter Forest does not discriminate nor tolerate discrimination in any form by its employees or contactors. Individuals are encouraged to report any instances of discrimination. Perimeter Forest has a company Health and Safety Policy, a Whistleblowing Policy, and a company code of conduct which will be adhered to at all times by employees and contractors. No reports have been made.
Sexual harassment	Perimeter Forest recognises and adheres to the laws and legislation surrounding human rights in Ontario and Canada. Perimeter Forest does not discriminate nor tolerate discrimination in any form by its employees or contactors. Individuals are encouraged to report any instances of sexual harassment. Perimeter Forest has a company Health and Safety Policy, a company code of conduct, and a Whistleblowing Policy which will be adhered to at all times by employees and contractors. No reports have been made.
Equal pay for equal work	Perimeter Forest adheres to the Employment Standards Act, 2000 (ESA) and a company code of conduct which commit to actions and policies to assure fair employment, including equal treatment in hiring and compensation and will not discriminate on any basis.
Gender equity in labor and work	Perimeter Forest adheres to Canada's legislation, which protects workers and allows workers the right to be treated equally, fairly, and free from discrimination.
Forced labor	Canada has strict laws preventing forced labour. Perimeter Forest will adhere to these laws.
Child labor	Canada has strict laws preventing child labour. Perimeter Forest will adhere to these laws.
Human trafficking	Canada has strict laws preventing human trafficking. Perimeter Forest will adhere to these laws.

25 The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

2.3.2 Human Rights

Risks identified	Mitigation or preventative measure(s) taken
Non - engagement with Indigenous Groups	Perimeter Forest recognizes that human rights are protected in Canada by the Canadian *Human Rights Act* and adheres to it. In addition, Canadian courts and legislation recognize that legal and customary rights (specifically use rights) and private property rights (i.e. right of ownership) may co-exist. There is an evolving legal framework related to Aboriginal and treaty rights and private lands in Canada. The Project Proponent has been assessed and certified as meeting the requirements of The FSC National Forest Stewardship Standard of Canada Forest Stewardship Standard (FSC-STD-CAN-01-2018 ENG). FSC Licence Code 'FSC-C187530' applies to the project area and demonstrates that the Project is in conformance with criteria C3.04 of the FSC standard as it pertains to UNDRIP and Canadian Law. This has been provided to the VVB. Perimeter Forest recognizes and respects Aboriginal and Treaty rights and is committed to the development of best practices with Indigenous People that reflect the principles of UNDRIP, ILO Convention 169 on Indigenous and Tribal Peoples and in accordance with the laws of Canada and the Province of Ontario. Identified best practices are: • Identify Indigenous Groups who may have an interest in the project. • Determine if Indigenous Groups want to engage with the Proponent related to Project Area • Obtain consent and engage in a culturally appropriate manner with those who wish to engage • Continue to engage under the principle of good faith • Build relationships with interested Indigenous Groups • Follow and adapt using FSC guidance as an example of best practice. FSC has recognized that this is an evolving framework. • These practices are being implemented and are being monitored and recorded in the Communication Tracker. This has been provided to the VVB and will be provided at each verification.

2.3.3 Indigenous Peoples and Cultural Heritage

Risks identified	Mitigation(s) or preventative measure taken
Negative impact on cultural heritage	All indigenous groups identified under the guidance of the MNR through Perimeter Forest's VCS stakeholder identification process were contacted and encouraged to make contact to ask questions and raise any concerns that they may have regarding the project, including cultural heritage site and values. Two of the First Nations groups engaged with the project and communicated that they did not have any known cultural heritage sites in the project area. Further attempts to connect with the other three First Nations groups were made in the spring of 2024. Perimeter Forest engaged a cultural heritage specialist with the MNR who arranged a data search for the property under the Ontario Heritage Act through the Ministry of Citizenship and Multiculturalism (MCM). The data search did not result in any known cultural or historic archaeological sites within the property boundary[26]. As part of maintaining FSC certification, Perimeter Forest has and will continue to engage with Indigenous groups concerning the project and will undertake consultations for the life of the project. No indigenous or other cultural heritage sites were identified under SFI certification stakeholder engagement with the previous ownership. Perimeter Forest is not expanding any infrastructure or undertaking any commercial timber harvesting on the land, therefore enabling any unknown or unidentified cultural heritage site to be protected. If harvests are necessary for forest health or salvage reasons, precautions will be made (ie frozen ground winter harvest, placing harvest buffers on provincially identified areas of high archaeological potential, etc.) to ensure unidentified sites remain protected. If an unidentified cultural heritage site is encountered, all work will be halted until the best course of action to protect the site is determined. This will include consultations

26 Documentation provided directly to VVB

	with indigenous groups and archaeologists as directed by the MCM. Perimeter Forest encourages access to the Project Area by Indigenous Peoples for cultural and traditional activities and continue to consult and engage with the identified Indigenous Nations.

2.3.4 Property Rights

Risks identified	Mitigation or preventative measure(s) taken
Leaseholder rights	The Project Area is private land, wholly owned by Perimeter Forest. There are over 200 leaseholders on the private land but outside of the Project Area. Perimeter Forest has ensured that the lease agreement is construed and governed according to the laws of the Province of Ontario and the laws of Canada applicable therein.
Respect for property rights	The Project Area is private land, wholly owned by Perimeter Forest. Canada and the Province of Ontario have laws with respect to private property rights (e.g. leaseholders). Perimeter Forest voluntarily provides access to the Project lands to Indigenous Peoples, stakeholders and the general public with the intent that their use of the Project Area will not come into conflict with project activities and will abide by applicable laws and regulations. The project does not impact property rights (per Section 2.3.5 below).

2.3.5 Benefit Sharing

Process used to design the benefit sharing plan	There are no negative impacts to property rights and therefore, there are no benefit-sharing agreements in place with any stakeholder groups.
Summary of the benefit sharing plan	There are no negative impacts to property rights and therefore, there are no benefit-sharing agreements in place with any stakeholder groups.
Approval and dissemination of benefit sharing plan	There are no negative impacts to property rights and therefore, there are no benefit-sharing agreements in place with any stakeholder groups.
Benefit sharing during the monitoring period	N/A

2.4 Ecosystem Health

	Risks identified	Mitigation or preventative measure taken
Impacts on biodiversity and ecosystems	No risks identified	The project activities are designed to be beneficial to biodiversity and ecosystems.
*S*oil degradation and soil erosion	No risks identified	No commercial-scale timber harvesting will be undertaken, so soil exposure is limited. Riparian zones will naturally re-vegetate and naturalize, reducing bank erosion. Annual road maintenance program will assess water crossing and culvert condition.
Water consumption and stress	No risks identified	No water consumption activities are planned.
Usage of fertilizers	No risks identified	No fertilizer activities are planned.

2.4.1 Rare, Threatened, and Endangered species

Is the project located in or adjacent to habitats for rare, threatened, or endangered species?

☒ Yes ☐ No

Species and habitat	Demonstrate that the project will not adversely impact habitats for rare, threatened, or endangered species.
Peregrine falcon (Falco peregrinus). Nest site on steep, rock cliff features.	Sighting in northern Home Township, one known nesting north of the Project Area along the Montreal River. Preferred habitat is steep, rock cliff features. All steep slopes >40% have been removed from the project area and this would include areas that meet the description of preferred habitat. They are a Species of Special Concern in Ontario under the Endangered Species Act (2007). The known nest site is outside of the Project Area and no forest management activities are planned within the vicinity, however, if project harvest activities are deemed necessary, the recommended buffers and breeding season (15 March to 31 August) restrictions as per the Ontario Ministry of Natural Resources Peregrine Falcon Habitat Management Guidelines would be followed.
Unnamed (confidential) Species at Risk Associated with unspecified habitat features.	An Area of Concern (AOC) exists in the Project Area, identifying this area as a High Conservation Value Forest (HCVF). This habitat qualifies as designated Species at Risk habitat according to the Ontario Endangered Species Act (2007). This unnamed species is an Endangered Species in Ontario, and a Threatened Species in Canada. No forest maintenance activities will be undertaken in this area of the Project Area unless guided by an approved plan from a Species at Risk biologist. The AOC established by the MNR consists of a 30 m no-harvest reserve that increases to a 500 m no- harvest buffer during specific times of the year to support mating/migratory patterns. The 500 m no-harvest buffer is a temporal legal requirement that the Project has voluntarily (in our Project activities) implemented as a full year round buffer. Therefore, under the Project, the AOC has been expanded to a full 500 m no-harvest buffer at all times. Habitat modification in this 500 m area will only be undertaken for habitat improvement purposes for the Species at Risk, and we will require modifications and habitat planning in this area be directed by Species at Risk biologists with particular expertise for the species.

Little Brown Myotis (Myotis lucifugus). October - April hibernate in caves that remain above freezing. May—September roost in suitable trees during the day	An Endangered Species in Ontario. Myotis bat species are likely in the Project Area and will be managed according to Perimeter Forest's Management Protocol for Threatened Bat Species which includes specific operational protection measures to be adhered to by all contractors working in the Project Area. There have been no known hibernacula or roost trees identified in the Project Area.

	Risks identified	Mitigation or preventative measure(s) taken
Habitats for rare, threatened, and endangered species	Negative impact on habitats for rare, threatened, and endangered species	Sighting of Peregrine Falcon in northern Home Township, one known nesting north of the Project Area along the Montreal River. Preferred habitat is steep, rock cliff features. All steep slopes >40% have been removed from the Project Area and this would include areas that meet the description of preferred habitat. They are a Species of Special Concern in Ontario under the Endangered Species Act (2007). The known nest site is outside of the Project Area and no forest management activities are planned within the vicinity, however, if project harvest activities are deemed necessary, the recommended buffers and breeding season (15 March to 31 August) restrictions as per the Ontario Ministry of Natural Resources Peregrine Falcon

		Habitat Management Guidelines would be followed. An Area of Concern (AOC) exists in the Project Area, identifying this area as a High Conservation Value Forest (HCVF). This habitat qualifies as designated habitat for an unnamed (confidential) Species at Risk according to the Ontario Endangered Species Act (2007). This unnamed species is an Endangered Species in Ontario, and a Threatened Species in Canada. No forest maintenance activities will be undertaken in this area of the Project Area. The AOC established by the MNR consists of a 30 m no-harvest reserve that increases to a 500 m no- harvest buffer during specific times of the year to support mating/migratory patterns. The 500 m no-harvest buffer is a temporal legal requirement that the Project has voluntarily implemented as a full year round buffer. Therefore, the AOC has been expanded to a full 500 m no-harvest buffer at all times. An Endangered Species in Ontario. Myotis bat species are likely in the Project Area and will be managed according to Perimeter Forest's Management Protocol for Threatened Bat Species which includes specific operational protection measures to be adhered to by all contractors working in the Project Area.

		There have been no known hibernacula or roost trees identified in the Project Area.
Areas for habitat connectivity	See above	See above

2.4.2 Introduction of Species

Perimeter Forest is working to ensure that there is no introduction of species to the Project Area. The Project activities do not include planting of species. Regeneration in this Project Area is all completed through natural regeneration.

Species introduced	Classification	Justification for use	Adverse effects and mitigation
Not Applicable	Not Applicable	Not Applicable	Not Applicable

Existing invasive species	Mitigation measures to prevent the spread or continued existence of invasive species
Not Applicable	Not Applicable

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	Risks identified	Mitigation or preventative measure(s) taken
Invasive species	Potential for species introduction	It was determined that there were two ways of potential species introduction into the Project Area. Firstly, fish bait from external sources. Perimeter Forest consulted with the local office of

		the Ministry of Natural Resources and Forestry and learned that the introduction of baits from outside sources was likely the cause of the demise of the trout fishery in the area. Perimeter Forest sent a letter to all leaseholders on April 19, 2023 requesting that leaseholders do not bring bait in from outside sources. The second potential species introduction was from firewood being imported from external sources as it has a risk of introducing non-native tree species and unwanted diseases and/or insects into the Project Area. Perimeter Forest sent a letter to all leaseholders on April 19, 2023 requesting that leaseholders harvest their firewood from the Project Area in moderation, with a preference to be limited to dead or fallen trees found near trails and road systems and to not bring in firewood from outside of the Project Area.

2.4.3 Ecosystem conversion

	Risks identified	Mitigation or preventative measure(s) taken
Ecosystem conversion	No risk identified	Not applicable to IFM projects as the project is not causing any ecosystem conversions

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	VM0012	VM0012: Improved Forest Management in Temperate and Boreal Forests (LtPF),	1.2
Tool	VT0001	VT 0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry, and other Land Use Project Activities	3.0
Tool	-	VCS AFOLU Non-Permanence Risk Tool	4.2

3.2 Applicability of Methodology

As shown in the table below, the Painted Forest Carbon Project is compliant with the applicability criteria of VM0012.

Methodology ID	Applicability condition	Justification of compliance
VT0001	AFOLU activities the same or similar to the proposed project activity on the land within the proposed project boundary performed with or without being registered as the VCS AFOLU project shall not lead to violation of any	The project activity does not lead to violation of any law.

	applicable law even if the law is not enforced.	
	The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario. Project proponent(s) proposing new baseline methodologies shall ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity	The stepwise approach outlined by VT0001 is documented in Section 3.4 of the PD.
VM0012	Projects which meet the most recent approved criteria for VCS Improved Forest Management – Logged to Protected Forest (IFM-LtPF) eligible projects	The project meets the approved criteria for VCS IFM-LtPF (see Section 1.3)
	Projects located in Temperate and Boreal Domain Global Ecological Zones (as defined by FAO (FAO, 2001)) which are forest lands remaining forest lands (as defined by IPCC (IPCC, 2003)), and which can meet IPCC GPG LULUCF Tier III inventory and data requirements (IPCC, 2003)	The project is located in the Temperate Ecological Zone. The project utilizes detailed site level inventory meeting Tier III criteria.
	Projects that meet the most current approved VCS Standard requirements for ownership	The Project Area is located on a fee simple property which is privately owned by PFGP, the general partner of Perimeter Forest.

	Projects on properties where the starting average annual illegal, unplanned, and fuelwood removals are less than 5% of total annual harvest levels (in CO2e) in the baseline scenario	The project involves no illegal or unplanned harvesting, and minimal fuelwood removals which are limited to branches and other unmerchantable, downed wood or slash left at roadside.
	Projects without managed peatland forests	The Project Area does not contain managed peatland forests.
	Projects where % wetlands are not expected to change as part of project activities	The project will not materially change the percentage of wetlands in the Project Area
	Projects that can demonstrate that no activity shifting leakage occurs to the proponent lands at the start of the project	Perimeter Forest can demonstrate that baseline activities are not being shifted to other areas as a result of the project since the proponent is not involved in commercial harvesting on any other forest properties. All of Perimeter Forest's lands are being developed as carbon projects.
	Projects which do not include de minimis application of organic or inorganic fertilizers in the project scenario	The project does not include application of any fertilizers in the project scenario.

3.3 Project Boundary

The project is spatially bounded by the parameters outlined in Figure 2 in Section 1.13. The relevant GHG sources, sinks, and reservoirs within the project boundary are identified in Table 4, as well as the identification of emission sources in Table 5 that are either included or excluded from the project boundary.

Table 4. Selection of Carbon Pools.

Carbon Pool	Selected?	Justification/Explanation
Above-Ground Tree Biomass	Yes	Required by VCS. Major carbon pool subject to changes from the baseline to the project scenario.
Above-Ground Non-Tree Biomass	No	Excluded by VCS. Minor carbon pool subject to changes from the baseline to the project scenario.
Below-Ground Biomass Pool	Yes	Required by VCS. Major carbon pool subject to changes from the baseline to the project scenario.
Dead Wood Pool	Yes	Required by VCS. Minor carbon pool subject to changes from the baseline to the project scenario.
Litter Pool	No	Excluded by VCS for AFOLU projects. Minor carbon pool – generally considered as a transitional pool only.
Soil Carbon Pool	No	Optional in VCS AFOLU IFM projects, but conservatively excluded in this methodology.
Wood Products Pool	Yes	Required by VCS. Baseline scenario involves logging.

Table 5. Emission sources included/excluded from the project boundary.

Source		Gas	Included?	Justification/Explanation
Baseline	Use of Fertilizers	CO_2	No	The baseline scenario does not include the use of fertilizer, therefore these emission sources are excluded. The exclusion of these emissions does not increase the emission reductions in the project.
		CH_4	No	
		N_2O	No	
		Other	No	
	Combustion of Fossil Fuels by Vehicles / Equipment	CO_2	Yes	The following emissions were included: from harvesting equipment, log transport, and manufacturing production of sawn wood, veneer, plywood, structural panels, non-structural panels, and paper. This is calculated in "VM0012_Workbook_Painted_FINAL_12_16_2024.xlsx"
		CH_4	No	
		N_2O	No	
		Other	No	

Source		Gas	Included?	Justification/Explanation
	Burning of Biomass (on site slash burning)	CO_2	No	The baseline scenario does not include burning of biomass as an activity, therefore these emission sources are excluded. The exclusion of these emissions does not increase emission reductions in the project.
Project	Use of Fertilizers Combustion of Fossil Fuels by Vehicles / Equipment	CO_2	No	The project scenario does not include the use of fertilizer, therefore these emission sources are excluded. The exclusion of these emissions does not increase the emission reductions in the project.
		CH_4	No	
		N_2O	No	
		Other	No	
	Combustion of Fossil Fuels by Vehicles / Equipment	CO_2	Yes	The following emissions were included: from harvesting equipment, log transport, and manufacturing production of saw wood, veneer, plywood, structural panels, non-structural panels, and paper. This is calculated in "VM0012_Workbook_Painted_FINAL_12_16_2024.xlsx".
		CH_4	No	
		N_2O	No	
		Other	No	
	Burning of Biomass (on site slash burning)	CO_2		The project scenario does not include burning of biomass as an activity, therefore these emission sources are excluded. The exclusion of these emissions does not increase emission reductions in the project.

The Timber Harvest Land Base (THLB) defines the Project Area land base that could be subject to timber harvesting, including spatially located areas within the project boundaries which are currently considered biologically and economically feasible for timber harvesting as per typical regional logging practices relevant to the project site. Removals from the THLB include: non-forest areas; physically inoperable or inaccessible areas due to terrain; current maintained roads; legally required or voluntary buffers and protected areas (i.e. riparian zones, wildlife areas, sensitive sites, etc.); and other areas which are not eligible for harvesting under typical or common practices determined in the baseline and project scenarios.

Figure 4 illustrates the areas included within the Timber Harvest Land Base (THLB) (operable area) and those excluded, including waterbodies, steep slopes over 40%, and others (combined, being the inoperable area). Table 6 displays the THLB and inoperable areas in hectares.

Table 6. The THLB and Inoperable areas in hectares

THLB Area (Operable)	Area (ha)

Tolerant Hardwoods	20,637
Intolerant Hardwoods	386
Conifer	10,521
Mixed woods	14,456
Sum:	**46,000.**
Inoperable Area excluded from the THLB	
*Note The individually removed areas are shown as total hectares, however, the polygons overlap and are not mutually exclusive so the sum will not equal the total. The VVB has reviewed the individual removed area file and they conform with the THLB area that defines the Project Area.	
HRIS Inoperable area (Water, non-forest, open wetland, treed wetland, rock, slopes >40%)	10,568
Lake and stream 3m buffer	695
Unnamed (confidential) Species at Risk No Harvest Reserve	84
Leased areas	100
80m HBU lake buffer	3,448
Mainline Roads	74
Sum:	**14,035**[27]
Total (operable + inoperable)	**60,035.0**

[27] Total of individual removed area = 14,969. Total of merged/dissolved individual files (THLB removals file) = 14,035.

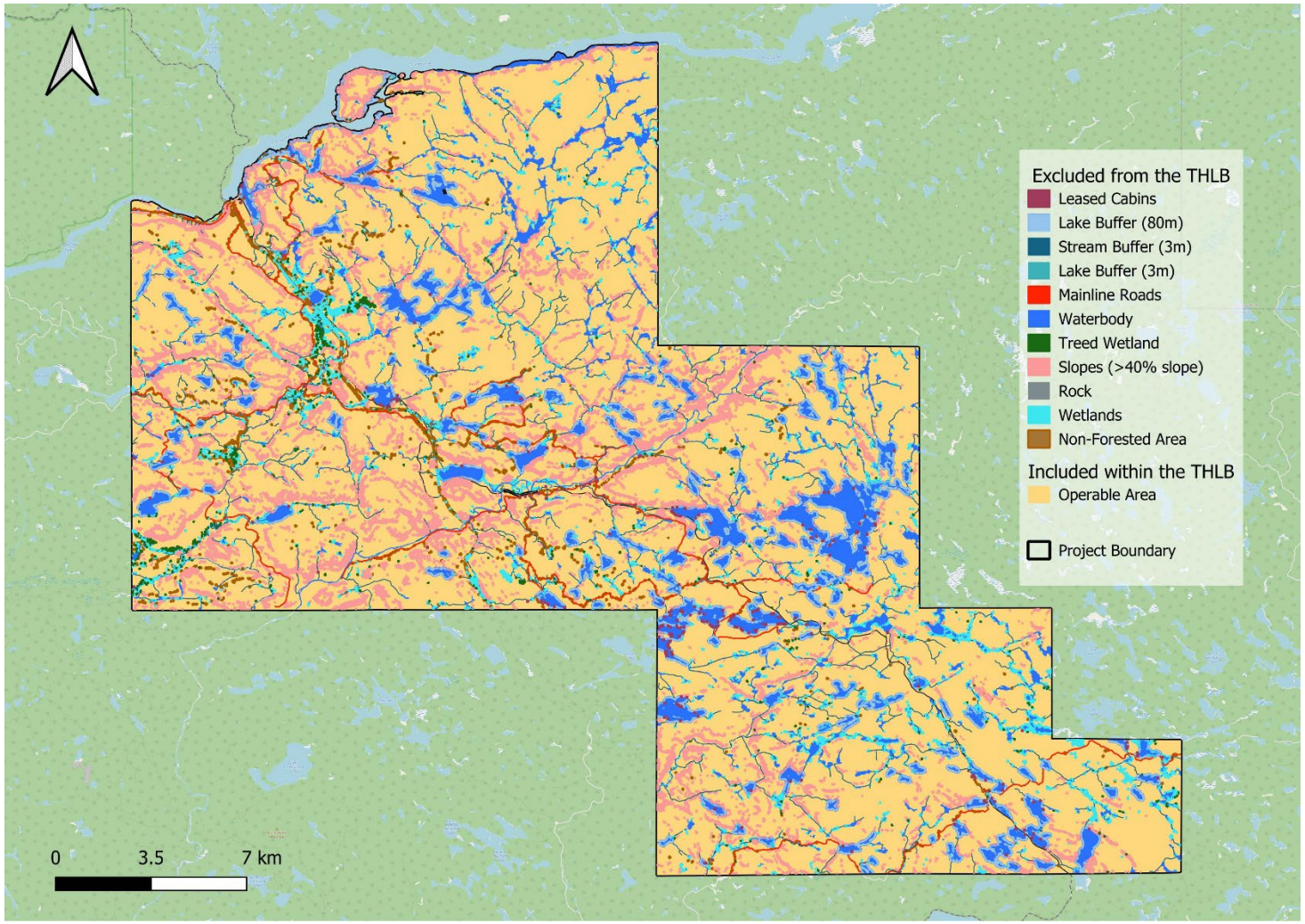


Figure 4. Map illustrating the areas included within the Timber Harvest Land Base (THLB) (operable area) and those excluded from the THLB as inoperable area.

3.4 Baseline Scenario

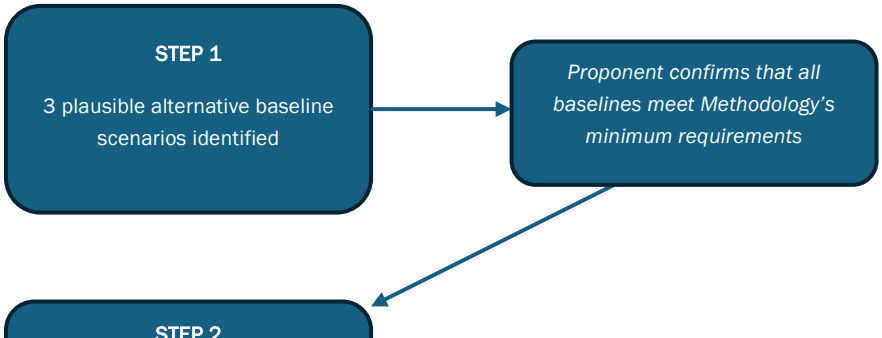
The VM0012 methodology outlines a 3-step procedure for determining the baseline scenario:

- STEP 1 – Identify Plausible Alternative Baseline Scenarios to the VCS Project Activity
- STEP 2 – Selection of a Single Baseline Scenario for the Project; either:
  - STEP 2a - The Historical Baseline Scenario – based on historical operating practices on the Project Area
  - STEP 2b - The Common Practice Baseline Scenario – based on previous owner activities
  - STEP 2c - The Common Practice Baseline Scenario – based on common practice activities
- STEP 3 – Additionality Test.

Overview of Baseline Selection Approach Taken by the Proponent

We have included overview diagrams of the baseline selection process to guide interpretation of the sections that follow and enhance understanding of the approach taken. For details of each of the overviewed steps, please refer to the sections that follow.

Figure 5. Baseline selection steps overview (Steps 1 through 3).



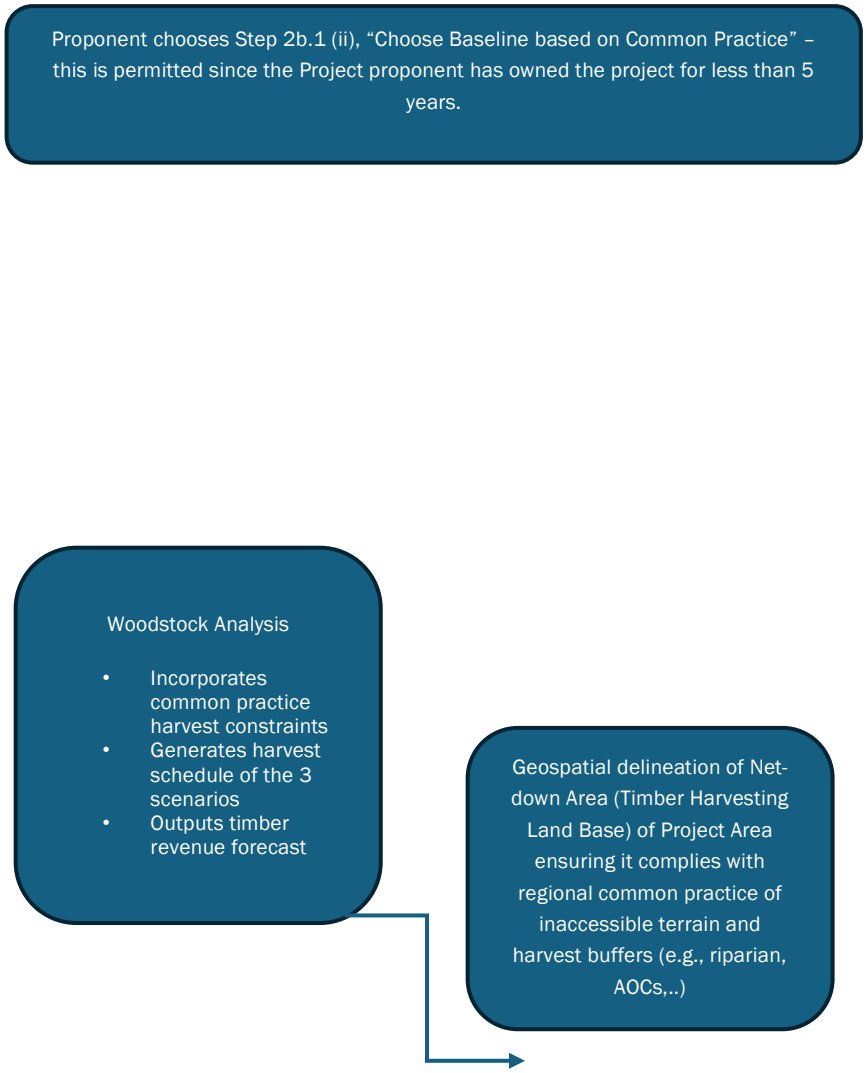
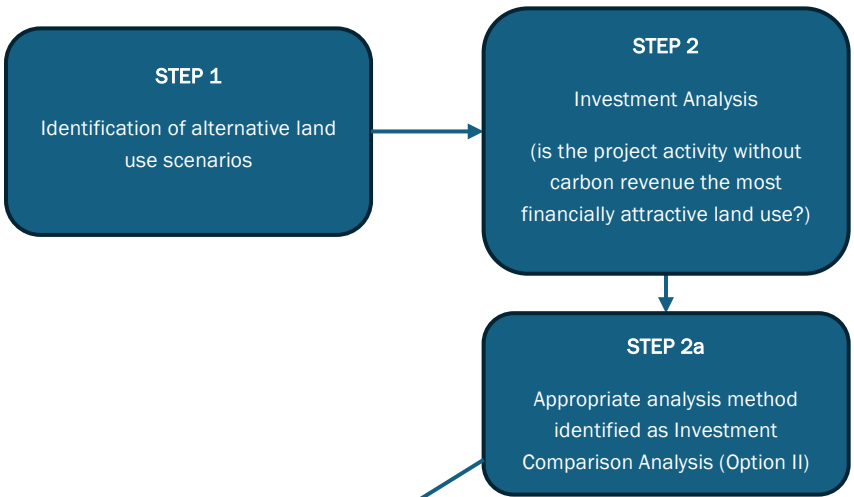
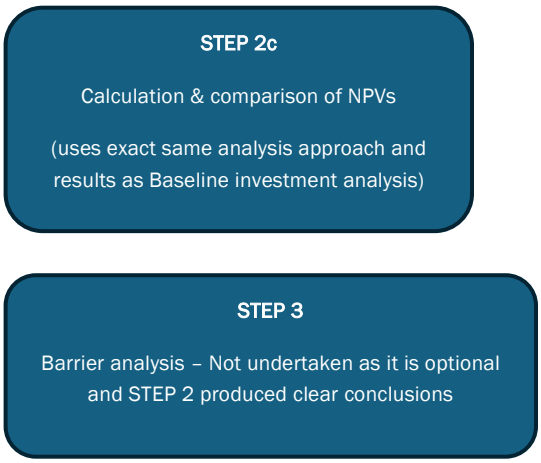


Figure 5. Additionality assessment steps (Steps 1 through 4).





STEP 1 - Identify Plausible Alternative Baseline Scenarios to the VCS Project Activity

- The Painted Forest Carbon Project has identified three (3) possible baseline scenarios that were evaluated in this baseline selection process, following the VM0012 process and requirements. As required by the methodology, the 3 plausible alternative baseline scenarios include the minimum of *Historical Practice Baseline Scenario* and *Common Practice Baseline Scenario(s)*.

These scenarios are as follows:

1) Historical Practice Baseline Scenario based on the forward-looking management plan of the preceding landowner;

2) Common Practice Baseline Scenario, based on reported values of regional common practice documented through a third-party report from an RPF (filename: "Common Practice_May13_Final.pdf"; herein referred to as the "Common Practice Report").

3) Project Activities in Absence of Carbon Credit Revenues

Further information on each of these potential baseline scenarios are provided below. In respect to all annual harvest schedules presented below, these are non-calendar year schedules. For carbon quantification, these harvests are converted into calendar year schedules to account for the project start date of September 2st, 2021 (a partial year of 4 months), yielding a Project that spans 101 calendar years, from 2021 to 2121.

1) **Scenario 1: Historical Practice Baseline Scenario: Continuation of the previous owner's management plan**

Harvest Schedule:

- 149,742 m^3 per year over the first 10 years, followed by 91,407 m^3 for the remaining 90 years in the Project's crediting period. See below for further information.

Background on Management by Preceding Owner: The Painted Forest was owned by an institutional investor that purchased the property in 2014 and placed the property up for sale in 2021. During their ownership term, vendor's management focused on timberland property development – this involved enhancing the value of the timberland property for timber harvest purposes, with upgrades and establishment of a new road network to gain access to the highest value timber reserves. Vendor spent $8 million in road improvements over 5 years to provide interior access to timber and access to rail sidings. The property was under Sustainable Forestry Initiative (SFI) certification during the vendor's tenure, with an SFI approved management plan. The management plan was updated in 2020 and stipulated a forward-looking annual allowable cut (AAC).

Harvest Schedule under Previous Owner's Forward-Looking Management Plan: The vendor's AAC under the SFI-approved management plan is 91,407 m^3 (harvest = assumed growth) plus unrealized AAC from previous years. For baseline evaluation, the project proponent has extended the management plan to apply over the Project's 100-year crediting period. This results in a harvest rate of 149,742 m^3 per year over 10 consecutive years (amortizing unrealized AAC over 10-years plus 91,407 m^3/yr AAC), followed by harvest equal to vendor's annual growth estimate (91,407 m^3/yr) over the remaining 90-yrs of the crediting period. This involves accounting for the unrealized AAC from the previous year (2020) when the management plan was updated and extending the plan to cover the full crediting period. The total 100-year harvest volume is 9,715,130 m^3.

Justification for Previous Owner's Management Plan – Alignment with Sustainable Forestry. In 2021, the previous owner solicited bids for the purchase of the project lands as they were divesting of all their Canadian timberland assets. Perimeter Forest participated as a potential purchaser and successfully secured the purchase of the project lands. To guide the bid price,

Perimeter Forest obtained a land appraisal report. This appraisal report evaluated the most likely purchaser of the lands and determined that in the region, private properties exceeding 100,000 acres in size are owned by institutional investors (pp. 8 of appraisal report). In the Highest and Best Use analysis, the report identifies that "… the highest and best use of the subject property is for sustainable timber production, with a secondary opportunity for recreational leasing, and potential carbon offset sales. The most likely buyers of the property in the current economic environment are institutional timberland investors." On the topic of institutional investors, the report notes that such investors "project long-term sustained yield management, and their bids typically reflect conservative management with upside for capital appreciation" (pp. 21). The vendor's forward looking management plan represents a sustainable timber management approach, which conforms to appraisal report's expectation of management approach post-purchase (long-term sustainable timber production).

2) **Scenario 2: Timber harvest maximizing NPV of timber revenue while constrained by legal and common practice**

- ***Harvest Schedule:*** A long-term average of 96,601m^3, beginning with 149,742m^3 annually in the first 13 sequential years and followed by an average annual harvest of 89,354 m^3 in the remaining crediting years. See below for further information.

The harvest schedule for this baseline scenario was generated using Remsoft Woodstock by optimizing harvest to maximize NPV of timber revenue. Harvest under the Woodstock modelling is constrained by legal and common practice (as defined in Table 7) and programmed to ensure sufficient annual timber supply (and harvest) is available so harvest revenue never declines below management costs. The operable area for this scenario is equivalent to Baseline Scenario 1 above and 3 below, except for the assumed sustained yield. Per the report on common practice provided by a third-party, similar properties in the area operate under an assumed sustained yield of 2.4 m^3/ha/yr. The Project operable area is 46,000 hectares, therefore an assumed sustained yield for the Project Area would have a long-term harvest average not exceeding 110,458 m^3/yr. A more conservative approach would be to adopt an assumed sustained yield intermediate between the previous owner's management plan (1.8m^3/ha/yr) and the Common Practice (2.4m^3/ha/yr) of other private landowners in the area. Therefore, an intermediate sustained yield of 2.10m^3/ha/yr is in this case adopted as a conservative assumption of Common Practice. This results in a Project Area sustained yield of 96,601m^3/year. Therefore, Woodstock was programmed to goal-seek a harvest scenario that maximizes the NPV of timber harvest revenue with the following two constraints: (1) average annual harvest over 100-years cannot exceed 96,601 m^3 while being further constrained that annual harvest (and harvestable wood supply) must always sustain timber revenue of $\geq$2x management cost; and (2) annual harvest cannot exceed 149,742 m^3 in any given year. The latter harvest limit threshold was adopted from the maximum harvest in Scenario 1 above, which in the Common Practice Report was deemed a valid and achievable front-end loading of harvest. The constraint that harvest revenue can never decline below management cost is targeted to avoid negative cashflow years in the future, which moderates the harvest over what would be defined under a pure max-NPV approach. The total 100-year harvest volume is 9,710,009 m^3.

3) **Scenario 3: Project activities in the absence of carbon revenues**

This scenario is intended to represent the undertaking of project activities (logged to protected) without a financial incentive from the sale of carbon credits. This baseline is evaluated to test whether the project is additional (i.e., if project activities without carbon revenue were to have the highest NPV, then the project would be deemed to have no additionality). In this scenario, no harvest occurs in the first 2 years (matched to actual project activities), followed by 10% of Scenario 1 harvest thereafter. The average annual harvest over the 100-year crediting period is 9,421 m^3.

Item iii) of Sub-step 1a, as outlined by the VT0001 tool:

"if applicable, activities similar to the proposed project activity on at least part of the land within the project boundary of the proposed VCS AFOLU project at a rate resulting from:

- *Legal requirements; or*
- *Extrapolation of observed similar activities in the geographical area with similar socioeconomic and ecological conditions to the proposed VCS AFOLU project activity occurring in the period beginning ten years prior to the project start date"*

It is not plausible that conservation would occur without carbon financing as there is no precedent in the region for properties similar to the Project property being procured for philanthropic purposes. Furthermore, there are no legal requirements to undertake the project activity.

Demonstration that All Baselines Meet the Methodology's Minimum Requirements

1. **Comply with IFM-LtPF project and eligibility requirements by only including activities and areas where forests remain forests.**
   Each of the 3 potential baselines comply with this requirement, as none include activities where forests are converted to non-forest.
2. **Comply with legal requirements for forest management and land use in the area**
   See Section 1.15 for legal requirements. Each of the evaluated baseline scenarios comply with the legal requirements applicable on the property and region (demonstrated through Common Practice Report).
3. **Environmental practices of baseline scenarios equal or exceed those commonly considered a minimum standard among landowners in the area**
   All potential baseline scenarios include timber harvesting. The area available for harvest under these scenarios (including through the Woodstock modelling and in the Carbon Budget Model of the Canadian Forest Service (CBM-CFS3)) used a THLB to define the total Project Area. The net-down was produced by removing forest available for harvest that fell within buffer zones, Areas of Concern (AOC) and inoperable areas (e.g., steep slopes). These constraints were defined by the previous owner's management plan and are at least as

stringent as environmental practices deemed Common Practices (see Table 7). Each of the baselines have harvest activity and utilize the same net-down area and common practice criteria, differing only in annual harvest rate. Details of the Net-down are shown in Table 8.

STEP 2 – Selection of a Single Baseline Scenario for the Project

STEP 2a - The Historical Baseline Scenario – based on historical operating practices on the property

This step is mandatory in instances when the project proponent has at least 5 years historical harvest level data history in the Project Area. The project proponent took ownership of the Project Area in 2021, i.e. within the last 5 years. Therefore, the project is permitted to choose to proceed to Step2b. The project proceeds on this basis to Step2b.

Step 2b – The Common Practice Baseline Scenario – based on previous owner activities

2b.1 – If the current project proponent has owned the property for less than 5 years then the project proponent may:

i. *Choose to use the previous managers historical activities or management plan as representative of common practice, in which case the baseline scenario is selected based on the process and criteria in Step 2a; or,*

ii. *Choose to select the baseline scenario based on common practice and investment analysis of scenarios as outlined in Step 2c below.*

Perimeter Forest acquired the property in September 2021 and has had ownership for less than 5 years and chooses Step 2b (ii) – "select the baseline scenario based on common practice and investment analysis of scenarios as outlined in Step 2c..".

STEP 2c – The Common Practice Baseline Scenario – based on common practice activities

The project proponent must select the baseline scenario that:

2c.1 – Generates the most financial attractive return on investment from forest products returns using Step 2 Option II **and/or** Option III in the most recent version of the VCS Tool for the Demonstration and Assessment of Additionality in VCS AFOLU Project Activities, **and**

2c.2 – Can be demonstrated to be regionally common practice and locally operationally implementable, including:

a. Compliant with the legally required land use and forest management practices in a manner consistent with VCS requirements (see Step 1);
b. Consistent with local market capacity for the baseline scenario activities and products (i.e. log markets, contractor capacity, etc.);
   Consistent with observable and verifiable regional operational practices, including, at minimum:

c. i. Harvest types (i.e. clearcut, selective cut, etc.),
ii. Logging and hauling equipment types and capabilities,
d. iii. Annual harvest levels (i.e. m^3/year, ha/year),
iv. Average minimum harvest age, tree size, and/or stand volume,
e. v. Average minimum economic viability (or decision criteria) by stand type,
vi. Average minimum log utilization specifications (on average based on size and/or species),and waste/breakage assumptions,
f. vii. Average tree retention practices, including hydro-riparian buffers, wildlife trees, and other single or grouped merchantable and un-merchantable tree retention,
viii. Maximum harvest slope or other operability constraints which would limit regional logging equipment,
g. ix. Reforestation and stand management practices; and operationally feasible on the Project Area using local harvesting and hauling technology, local infrastructure, etc.

In respect to 2c.2, the Common Practice criteria above are outlined below along with management specifications determined to be Common Practice in the region (see Table 7). All elements of regional common practice and demonstration that the baselines are operationally implementable are covered at a high-level in Table 7 and in more detail in the Common Practice Report supplied to the auditors.

Table 7. (see next page) Common practice summary and application to the THLB and baseline modelling, derived from verifiable evidence provided through a report prepared by a Registered Professional Forester (RPF) (the Common Practice Report).

Practice Criteria	Specifications Adopted by the Project	Common Practice/BMPs used regionally
a. Legally required land use and forest management practices	Private land in Ontario is lightly regulated with minimal land protection requirements and regulations. Limited to the federal Fisheries Act to protect fish habitat (3m stream and lake buffer, as defined in regional SFI certification BMPs) and the provincial Lakes and Rivers Improvement Act for stream crossings that meet specific criteria requiring a permitting process with district. Species At Risk Act: requirements around known habitat protection, i.e species at risk habitat buffers.	Same criteria as project
b. Consistent with Local market capacity for the baseline scenario and products	Sewall Appraisal Report[1]: pp.8-9. RPF verification of this report for the Canadian elements. Property advantaged by truck and rail access to US markets for pulp and sawtimber.	Same criteria as project.
c.		
(i) Harvest Types	Clearcut with 15% volume retention applies to: Conifer, Conifer dominant mixedwood, intolerant dominant mixedwood, intolerant. Tolerant hardwood and tolerant dominant mixedwood managed with shelterwood and final overstory removal in 20 years following initial cut consistent with historical practice on the subject property. Of the harvested area, a maximum infrastructure footprint (roads and log landings) of 4% is best practice in Ontario (Forest Management GUide for Conserving Biodiversity at the Stand and Site Scales). The project allowed for a conservative 2% of harvested land area to convert to non-forest.	Same criteria as project. The most common practice on private lands in the region are clear cuts and various forms of irregular shelterwood regulated by diameter limits on residual trees. Best practice on road/landing footprints is ≤4% of harvested landbase.
(ii) Logging and hauling equipment and capabilities	At the time of purchase the main contractor on the property utilized a feller buncher, processor (cut to length), forwarder, self-loading truck, dedicated self-loading truck, on property rail siding infrastructure. The equipment can process 150,000 m3/yr dependent on shifts and equipment utilization. Contractor maintained a logging camp on the property. Other contractors available in the immediate vicinity.	Same as project criteria. Contractors in the immediate vicinity use conventional harvesting (feller bunder, skidder, slasher) and cut to length (processor, forwarder) systems.
(iii) Annual harvest levels (m3/yr)	Utilized the forward-looking harvest from the previous owner's forest management plan (149,742 m3/year for first 10-years, 91,407 m3/year thereafter).	Comparable local private lands assume and implement sustainable harvest rate at 2.4 m3/ha/year.
(iv) Average minimum harvest age, tree size, and/or stand volume.	A general minimum age of 60 years is used for conifer stands, conifer leading mixed stands, intolerant hardwood stands, and intolerant hardwood mixed stands to ensure trees sizes are sufficient for sawmill and pulp mil specifications. Crown forest tolerant hardwood harvest practices (minimum basal area, certified tree marking, cutting cycles) are not used on private lands within the region. Private land managers will assess timber valued based on assessment experience and if there are sufficient merchantable trees the stand will be allocated for harvest. Common practice for tolerant hardwood leading stands on private land (mixedwood tolerant hardwood, and tolerant hardwood) is a shelterwood system. For tolerant hardwood stands and tolerant hardwood mixed stands, a shelterwood system was modelled with initial cut at 50% removal requiring minimum age of 60 years and final overstory removal 20-years post initial cut. Based on G&Y curves, this equates to an age 60 stand volume of 124m3/ha for mixedwood tolerant hardwood leading stands and 123m3/ha for tolerant hardwood leading stands	Same criteria as project. Tree marking is no longer practiced on comparable lands
(v) Average minimum log utilization specifications (average based on size and/or species), and waste breakage assumptions.	Current Market specifications: Hardwood minimum harvestable saw log tree size > 10 inch (25.4 cm) dbh; Conifer saw and all pulp >6 inch (15 cm) dbh. Waste and breakage are terms used in western North America. In Eastern north America gross merchantable volumes are adjusted for cull, defect, and expected losses (see growth and yield work for professional estimates).	Same criteria as project.
(vi) Average tree retention practices, including hydro-riparian buffers, wildlife trees, and other single or grouped merchantable and un-merchantable tree retention.	3m buffer no harvest on mapped rivers, streams, and lakes (SFI BMP, Fisheries Act). 30m no harvest buffer for a particular identified species at risk habitat (applies to baseline and project scenario) per Species at Risk Act with a 500m AOC seasonal harvest and road maintenance restriction (referred to as AOC). Project follows the previous owners management plan on the AOC which exceeds common practice by voluntarily working with the provincial Ministry of Natural Resources and Forestry. No requirements for tree retention practices on private land unless part of Species at Risk habitat requirements. Often oversized (dbh ~32 inch/80 cm) are not harvested on private land and act as quality wildlife trees. Selection harvest creates retention as default and retention areas would be co-located with high wildlife value areas. Clear cuts on private land generally have 15-20% retention due to leaving undesirable or oversized trees, leaving ample retention for wildlife considerations.	Same criteria as project. Private land has minimal regulations and there is minimal participation in third party certification schemes in the region. Some private lands harvest oversized trees as they can be split after delivery by a regional log broker.
(vii) Maximum harvest slope or other operability constraints which would limit regional logging equipment	Max harvest slope of 40% (based on previous owners forest management practices and operable area) used for the Timber Harvesting Land Base.	45 – 50% max slope used for Algoma Crown Sustainable Forest Licence management planning. No cable logging is used in the region.
(viii) Reforestation and stand management practices	Natural regeneration for all forest types and harvest scenarios.	Same criteria as project. Private land in the region relies on natural regeneration. Crown land harvesting requires forest managers maintain conifer representation and often seedings are used to achieve this.
(d) Operationally feasible on the project area using local harvesting and hauling technology, local infrastructure, etc.	The property has a better than average infrastructure(1). The access to US markets by rail and truck is a significant market advantage. Contractor capacity in the region is sufficient to meet the baseline projections. Road networks for truck hauling to rail sidings and equipment movement across the property is well developed and expanded by the previous owners for the purposes of timber harvesting. The property also has significant aggregate deposits to facilitate road building and maintenance.	Same criteria as project, however, on property rail sidings are not common.

1. Sewall Appraisal Report: "OTPP_Algoma Appraisal.pdf"
2. "Forest Management Plan: "Algoma - Ten Year Plan.pdf"

The project incorporates the Common Practice criteria to determine the area available for harvest. The Project Area was defined by removing from the HRIS forest inventory those areas not available for harvest or otherwise outside of the Project Area (the net-down area, or THLB). This results in a final Project Area as provided in "HRIS_v01_08_01_netdown_zero_ha_removed.gpkg". This "netdown" inventory was used for all project analysis and carbon modeling. Shapefiles of all of the removed areas have been provided to the auditor.

The below classified variables were used to define the timber harvesting landbase (THLB) and define the Project Area, with removal of each of the following:

- Rock – non- treed rock outcrops
- AOC no harvest buffer – This is applied under the Species at Risk Act as the species has been identified on the property.
- Mainline roads – Property road network that is considered "primary road" and will be maintained throughout the project crediting period.
- Camp lease polygon – This area represents the area of leased camp lots on the property.
- Lake and stream no harvest buffers – This 3m buffer is required under the Federal Fisheries Act to ensure the protection of fish and shore habitat on mapped streams and lakes.
- Non-Forest land. This could be landings, road clearings, hydro ROW, and open areas not classified as wetland or water etc.
- Wetlands – open and treed wetlands that are not forest.
- 80 m buffer on certain lakes – This area was removed from the project for highest and best use purposes as these areas support the camp lease program and is therefore outside of the Project Area.
- Water – open water bodies
- Inoperable slopes >40% - Slopes >40% were considered inoperable under the previous owners FMP, and this same constraint was used for our THLB. We note this is conservative, as regional planning on public lands considers slope >45% (and up to 50% in some situations) as operable.

Each of these were removed in sequence from the initial HRIS inventory. Note that each of these classified variables are not in each case mutually exclusive (an area can be "Rock" and also within a "No Harvest Buffer"). The below table summarizes the total contribution of each to the reduction in Project Area.

Table 8. Classified variables used to reduce the landbase to the Project Area with their respective contribution to the reduction (reported in hectares).

Removed from Property Inventory	Area ha

*Note The individually removed areas are shown as total hectares, however, the polygons overlap and are not mutually exclusive so the sum will not equal the total. The VVB has reviewed the individual removed area file and they conform with the THLB area that defines the Project Area.	
HRIS Inoperable area (Water, non-forest, open wetland, treed wetland, rock, slopes >40%)	10,568
Lake and stream 3m buffer	695
Unnamed (confidential) Species at Risk No Harvest Reserve	84
Leased areas	100
80m HBU lake buffer	3,448
Mainline Roads	74
Sum:	14,035[28]

STEP 2c.1 Results

The project chooses Step 2 Option II – apply investment comparison analysis. All three (3) potential baseline categories discussed under STEP 1 were evaluated using discounted cashflow (DCF) analysis (NPV) to identify and rank the baselines according to financial return from forest products returns.

Table 9. A summary of the discounted cashflow analysis results.

	Scenario 1	Scenario 2	Scenario 3
NPV (CAD)	-$20,522,132	-$20,910,009	-$68,164,767
Percent of Best	100% (best)	98%	30%

Based on the DCF analysis results Table 9, the selected Project baseline is Baseline #1 (less negative NPV – negative values owing to conservative forecasting of revenue and costs over 100-years).

2(b) - *Timber harvest constrained by legal and common practice and eligible for sustainable forestry certification*

The final test in Step 2c., item 2, is also confirmed:

The baseline scenario can be implemented in accordance with the legal forest management requirements for private forestland in Ontario and implements a harvest regime that is at least

[28] Total of individual removed area = 14,969. Total of merged/dissolved individual files (THLB removals file) = 14,035

as conservative as Common Practice forestry for similar forestlands (see Common Practice Report in Table 7).

STEP3 – Additionality Test

See section 3.5.

3.5 Additionality

3.5.1 Regulatory Surplus

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☒ Annex 1 country ☐ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

☐ Yes ☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

☐ Yes ☐ No

N/A

3.5.2 Additionality Methods

Additionality of the project is assessed via VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities, v3.0[29]

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

Credible land use scenarios to the proposed project activity are listed below, and mirror those of the baseline scenarios (Scenarios 1, 2 and 3).

29 https://verra.org/methodology/vt0001-tool-for-the-demonstration-and-assessment-of-additionality-in-vcs-agriculture-forestry-and-other-land-use-afolu-project-activities-v3-0/

Those deemed plausible scenarios on the land include scenarios 1 and 2 for reasons outline in Section 3.4, Step 1.

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

All project land-use scenarios identified are legally permissible to be undertaken on private property in Ontario (see Common Practice Report).

Sub-step 1c. Selection of the baseline scenario

4) See Section 3.4, in line with VM0012. The chosen baseline scenario is Scenario 1: Historical Practice Baseline Scenario – Continuation of the previous owner's management plan.

Step 2. Investment analysis

Sub-step 2a. Determine appropriate analysis method

The VCS AFOLU project generates income from recreational and industrial leases. Although these revenues are consistent across all baseline scenarios, for transparency and consistency to analyses done in **STEP 2 – Selection of a Single Baseline Scenario for the Project**, Option II is selected.

Sub-step 2b. – Option II. Apply investment comparison analysis

The most relevant financial indicator is NPV comparison using DCF Analysis.

Sub-step 2c. – Calculation and comparison of financial indicators

Per Sub-step 2c (a): Calculate the suitable financial indicator for the proposed VCS AFOLU project without the financial benefits from the VCS and for the other land use scenarios.

See Step 2c.1 Results above found in Table 9.

Per Sub-step 2c (b) – we provide the analysis assumptions. All potential scenarios include as costs an equivalent land management cost ($3.50/acre indexed at 2.0%), and property tax ($27,000/yr indexed at 2.0%). Road infrastructure costs included in all scenarios as $281,250/yr for first four years. Lease revenue for all scenarios is $311,687/yr indexed conservatively at 2.0% (CPI over 40-year period from 1984 to 2023 is 1.2% source: Bank of Canada). Land terminal value set as 52% of gross timber value (consistent with value at time of purchase). Project development costs for scenario 3 (project scenario without VCU revenue) are conservatively excluded, which favours a higher NPV for scenario 3. Discount rate set at 6% and

stumpage rates per appraisal report, with stumpage indexed at 2.0%. All input parameters, with exception of harvest rate (specified by baseline scenario type) are derived from and supported by the appraisal report. The timber revenues and entire DCF Analysis workbook are provided in "Painted_WoodstockAnalysis_DCFProject_12_06_2024.xlsx". Initial investment set as the purchase price of the property. No debt instruments were used in purchasing the property, therefore no cost of servicing debt is applicable. This is evidenced by audited financial statements and land titles provided to the validation & verification body.

Per the analysis results, all land use scenarios have a higher NPV than the project activity without VCU-related income, therefore the VCS AFOLU project cannot be considered financially attractive. The results of Step 2c1 hold, and the project is additional.

Sub-step 2d. – Sensitivity analysis

The analysis in Sub-step 2c already used the most conservative assumptions that would favour a high NPV for the VCS AFOLU project without VCU-related income. To go one step further, we have re-run the Woodstock analysis where stumpage revenues are reduced by 20% for all scenarios. This results in 100-year NPVs for scenarios 1 through 3 as follows: scenario 1 = -$31,165,468 NPV; scenario 2 = -$31,475,768 NPV; scenario 3 = -$69,279,576. The outcome of this analysis indicates that Scenario 1 maintains the higher NPV of the alternative baseline scenarios, confirming that this baseline withstands more conservative assumptions around profitability.

STEP 3: Barrier analysis

Barrier analysis is an option (not required) by the VT0001 tool, as it notes "*barrier analysis may be performed instead of or as an extension of investment analysis*". Given the clear outcome of the sensitivity analysis which confirms that the proposed VCS AFOLU project without the financial benefits from VCU revenue is not financially attractive, we forego barrier analysis and proceed directly to Step 4.

Step 4: Common Practice Analysis

Analysis of the extent to which similar activities have already diffused in the geographical area of the proposed VCS AFOLU project activity.

The Algoma Highlands Conservancy purchased 1,060 hectares of land in 2009 for $1.5 million through $400,000 in private donations, $400,000 from the Ontario Ministry of Natural Resources Greenlands Challenge program, $150,000 from the EJLB Foundation, $10,000 from the McLean Foundation, $3,000 from the City of Sault Ste. Marie and $240,000 from Chuck Peterson's

bequeathment to the Algoma Highlands Conservancy[30]. The conservation purchase aims to conserve the ecological integrity of the Algoma Highlands, facilitate low-impact recreational activities, conduct environmental research and enhance public awareness of the environment. There is no precedent for a conservation acquisition at the scale of the Painted Forest in the absence carbon finance in the region. Further, as outlined in the appraisal report, the most likely acquirer of the property is an institutional timberland investor. The above indicate that the undertaking of project activities such as the Painted Forest project absent carbon finance are not common practice in the region.

3.6 Methodology Deviations

The project applies five deviations to the VM0012 methodology as follows:

(1) We combine a plot-based forest inventory, in accordance with VM0012, with a High-Resolution Inventory Solution (HRIS), to create an enhanced forest resource inventory (eFRI) database. The deviation will not negatively impact the conservativeness of the quantification of GHG emission reductions or removals. The deviation relates only to the criteria and procedures for monitoring or measurement, and does not relate to any other part of the methodology. A full High Resolution Forest Inventory Methodology Report (Tesera, 2022) is provided in Appendix D. Note, the name Montreal River Lands is used in place of Painted Forest within the report, but they refer to the same Project Area with same spatial boundaries. The deviation does not remove any steps from the VM0012 methodology: the field inventory requirements remain the same. The CBM-CFS3 model applies the equations internally. Instead, the deviation adds to the inventory requirements, via the HRIS.

As technology improves in the future, it is hoped that field inventory requirements can be modified in favour of LiDAR and 4Band imagery based inventory data but, for the time being, field requirements remain in line with VM0012.

(2) For measurement of Dead Organic Matter (DOM) density in the field. VM0012 states that “Each piece of dead wood will be assigned to one of three density classes, sound (1), intermediate (2), and rotten (3)”; however, the proponent follows Ontario industry standard to measure DOM density according to five density classes[31], [32] outlined in the Standard Operating Procedure (Appendix N). This five-class approach allows for the capture of greater detail in field measurement and is commonplace in Ontario forestry practices.

(3) For Equation 21 which calculates the amount of carbon contained harvested wood products after milling an error in the methodology itself was identified. Equation 21 results in increased carbon in harvested wood product after the fraction/ratio of growing stock volume is removed

30 https://irp.cdn-website.com/63e871bc/files/uploaded/ahc-2009-annual-report.pdf

31 Ontario Ministry of Natural Resources and Forestry. 2016. Ontario Ministry of Natural Resources and Forestry Growth and Yield Program, PSP and PGP reference manual, 2016 field season, operational draft (May 16, 2016). Ontario Ministry of Natural Resources and Forestry, Science and Research Branch, Peterborough, ON. 677 p.

32 Vegetation Sampling Network Protocol: Technical specifications for field plots (technical manual TM-10, version 2.0 2021),

for a product type, whereas a decrease would be expected. The deviation includes an alternative method of calculating the amount of carbon contained in harvested wood product. Refer to Section 5, "Carbon Storage in HWP Products" and tables "HWP_Vars" and "HWP_Woodsheet" in "VM0012_Workbook_Painted_FINAL_12_16_2024.xlsx" for further information.

Emissions Reductions from Harvest operations and Buffer Pool: The project includes emissions from logging, transportation and processing. As these emission reductions are considered permanent, the buffer should not apply to this emission reduction, which is contrary to the requirement of the VM0012 methodology. Verra's Guidance for Agriculture, Forestry and Other Land Use Projects[33], however, supports our determination and indicates the buffer deduction is only to be applied to the non-permanent net GHG benefit of a project.

(4) Sequence of leakage and buffer deductions: the sequencing of these deductions within VM0012 methodology does not follow the sequence required by the Verra Standard. As per guidance from Verra, the correct sequence is to first apply the buffer deductions to the carbon stocks, and then apply the leakage/uncertainty deduction to the net emissions. The project has followed this procedure.

4 IMPLEMENTATION STATUS

4.1 Implementation Status of the Project Activity

The Painted Forest Carbon Project is seeking initial validation and verification from 02-September-2021 to 31-December-2022. No changes (e.g., to project proponent or other entities) occurred. Project activities during this period included no management activities nor timber harvesting.

No stand-level management activities such as small-scale timber harvesting, and thinning, biodiversity enhancement activities, access management, and other forest health management were carried out.

No loss of carbon stock/ events occurred during the monitoring period that have any impact on the GHG emission reductions or removals. The ex-ante stocks are also the ex-post carbon stocks, due to the project start date commencing prior to validation.
Description of leakage monitoring and management can be found in Section 7.4. Non-permanence risk factors will be assessed at each monitoring period. The VCS non-permanence risk tool will be fully evaluated prior to each project verification.

33 https://verra.org/wp-content/uploads/Guidance-for-AFOLU-Projects.pdf

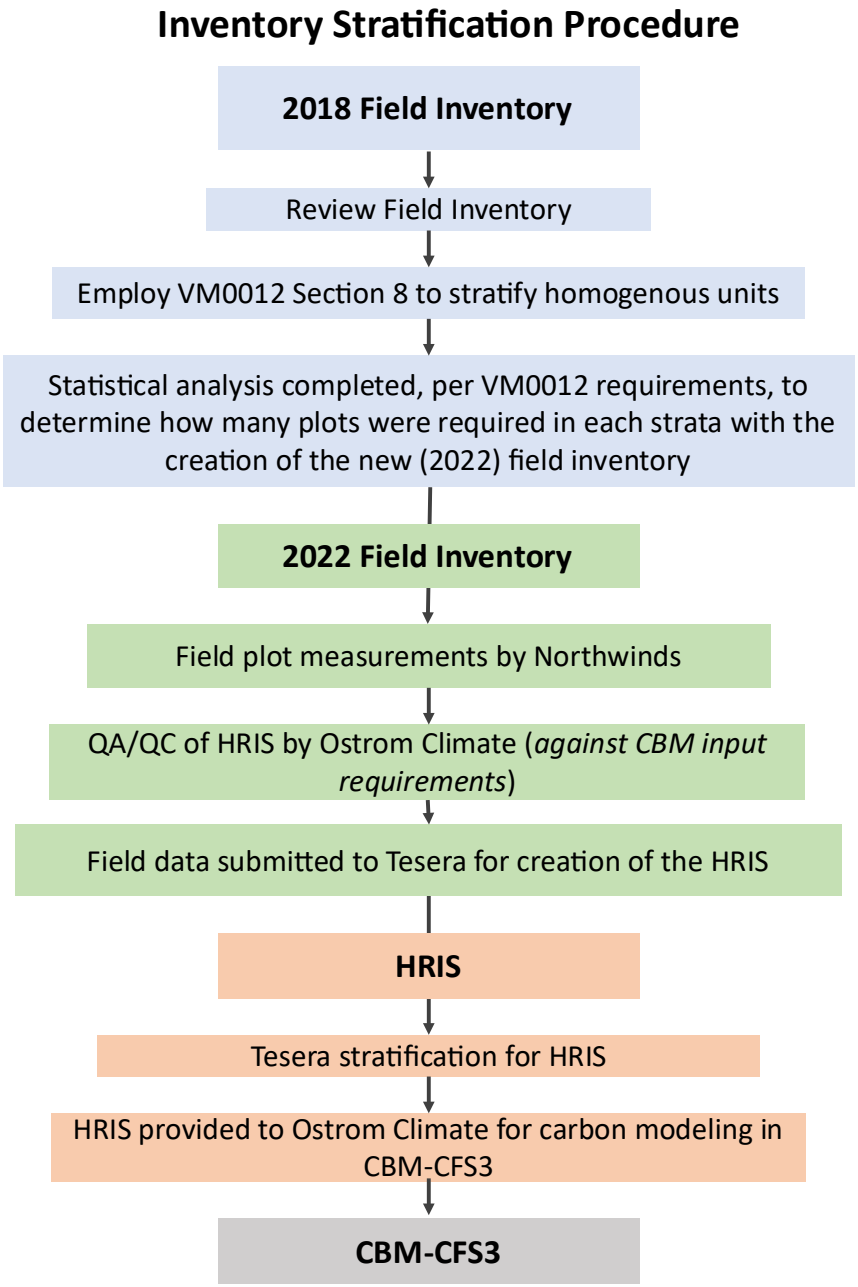
5 QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

The project is based on a valid starting forest inventory prepared by Tesera Systems Ltd specifically for the project. The design and production of the forest inventory was supervised by Mark Balogh RPF, a forester with knowledge and experience of forest inventories in the Great Lakes – St. Lawrence region of Ontario. Inventory data was collected in the summer of 2022 using a combination of calibration field plots (a network of 125 permanent sample plots were established across the property to calibrate the HRIS inventory and 104 of these plots are within the Project Area and will be monitored through the crediting period. Unless otherwise noted, reference to "plots" in this document refers to plots within the Project Area. Fieldwork was completed by NorthWinds Environmental Services and LiDAR and 4 Band capture was completed by KBM Resource Management. The inventory attributes of stand age class and site index were sourced from the Ontario Forest Resource Inventory and then validated and incorporated into the Tesera project inventory. The Tesera HRIS results in a "wall-to-wall" inventory of the forest at a resolution of 0.2 ha polygons across the entire 60,035 ha property and 46,000 ha Project Area, a much wider coverage than typical ground sampling plots or points.

The project uses custom growth and yield curves developed by an independent local forestry firm, McLean Forest Resource Management Inc, using both provincial data (Ontario's Modeling and Inventory Support Tool (MIST)) and data from the pre-existing permanent sample plots and project calibration plots in the Project Area. MIST is a standard tool used to model growth for forest management and is developed and validated by the Ontario's Ministry of Natural Resources. CBM-CFS3was then used to model the carbon dynamics of the Project Area. MIST and CBM-CFS3 meet all the criteria in Section 8.1.1 of the VM0012 methodology. Appendix D details the technical specifications of the growth and yield development, and supporting data is provided in Appendix G and Appendix H.

The net down HRIS includes over 260,000 stands, which exceeds the capacity of CBM-CFS3, which can only process up to 40,000 stands in a single run. To accommodate this limitation, the stands were aggregated by age and the areas were summed during the input data preparation process. This approach resulted in a refined dataset of 2,145 stands for inventory input. As CBM is an aspatial model, the stratification of the HRIS in preparation for CBM-CFS3 input was also undertaken aspatially, whereby the dataset was divided into sections with equal number of stands.

The various stages of stratification throughout the project's development are documented in the below flow chart:


Inventory Stratification Procedure
2018 Field Inventory
Review Field Inventory
Employ VM0012 Section 8 to stratify homogenous units
Statistical analysis completed, per VM0012 requirements, to determine how many plots were required in each strata with the creation of the new (2022) field inventory
2022 Field Inventory
Field plot measurements by Northwinds
QA/QC of HRIS by Ostrom Climate (against CBM input requirements)
Field data submitted to Tesera for creation of the HRIS
HRIS
Tesera stratification for HRIS
HRIS provided to Ostrom Climate for carbon modeling in CBM-CFS3
CBM-CFS3

5.1 Baseline Emissions

As described in Section 3.4, the project will use "Step 2c: The Common Practice Baseline Scenario – based on common practice activities". The resultant baseline harvest schedule is an Allowable Annual Cut of 149,742m^3 annually in the first 13 sequential years, followed by an average annual harvest of 89,354m^3 in the remaining crediting years.

Valid Starting Inventory Requirements

A valid starting inventory was commissioned by Perimeter Forest in 2022. Tesera Systems was contracted to create the starting project forest inventory from field data (permanent calibration plots) collected in summer 2022 by NorthWinds Environmental and airborne LiDAR and 4 Band Imagery data collected by KBM Resources Group in 2022. The project meets the valid starting inventory requirements from VM0012:

- The inventory covers the entire Project Area.
- A new forest inventory was created in 2022 from data collected in 2022.
- Documentation on all inventory methods is available in the Tesera methodology document and ancillary supporting documents, listed in Appendix D.

The inclusion of LiDAR data, and associated analysis, enables a more comprehensive forest inventory than would be possible by field measurements alone.

The 2022 Painted Forest inventory is housed with Perimeter Forest's, Tesera's and Ostrom Climate's file servers as a spatial database. The inventory spatial database is comprised of polygons with detailed attributes including tree count, tree species, tree height and tree diameter.

Future project inventory updates will be completed using a combination of field-based re-measurement of permanent calibration plots and periodic LiDAR data capture and analysis.

Baseline Scenario Area Stratification

Step 1 – Area stratification

The 2022 forest inventory for the Project Area is provided in Appendix K. Once the inventory was completed, the Project Area was further stratified/grouped into four forest units (FU's) based on leading species stand composition as informed by the growth and yield curve development. All polygons are attributed by stratum type to match the growth and yield curves for the Project Area. Age class data was obtained from the most recent provincial FRI inventory (see Appendix L).

Step 2 – Identify areas eligible for specific management activities

The portion of the Project Area that contributes carbon stocks and that are subject to baseline and project scenario management activities (the THLB) were informed using the HRIS inventory including forest type, stand age, riparian buffers and terrain operability constraints. The spatial

area to be harvested in the baseline is based on the Perimeter Forest FMP (Appendix C) which follows laws and regulation in Ontario, Canada and was modelled in Woodstock.

2022 LiDAR data was used to refine the terrain constraints (e.g. steep slopes and rocky areas) that inform the baseline and project scenarios. 2022 forest inventory data was used to validate and refine the inoperable area according to the following parameters:

(a) Steep slopes (>40% slope)

(b) FRI non-forest FUs (non-forested areas), including the mainline road network

(c) 3m buffers on provincially mapped streams and lakes. (*Federal Fisheries Act* informed by the Central Canada SFI Implementation Committee document "A Guide to Best Management Practices for Forest Operation in Northern Ontario and Manitoba For Private Landowners & Logging Contractors".

(d) Species at Risk AOC reserve management areas (*Endangered Species Act*) (30m no-harvest buffer on identified habitat component)

(e) 80m buffer on lakes deemed to have a highest-and-best use as recreational leasing area (referred to elsewhere as the 80m HBU lake buffer)

Figure 4 illustrates the THLB and inoperable area.

Non-forest, transmission line corridors, and road and rail rights-of-ways are assumed to have no carbon stocks for the purpose of the project. Main line road rights of ways have a width of 7-8 m and the rail rights-of-way are excluded from the Project Area. A dataset containing an inventory of known roads in the area was sourced from public data with edits and additions from the previous owner of the Project Area.

Within the THLB area, carbon stocks are then modelled for each year of the project using CBM-CFS3 for both baseline and project scenarios.

Model Selection and Use

The Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3) was selected to model carbon stock changes over time for both the baseline and project scenarios. Development of the first version of the first Carbon Budget Model began in 1989, and development of the CBM-CFS3 in 2001 and has been under continuous use and development with the latest update being in 2021. Additionally, CBM-CFS3 has been calibrated for all ecological boundaries of Canada, including Ontario's ecological boundaries of Boreal Shield East, Boreal Shield West, Hudson Plains, and Mixedwood Plains (the Project Area lies within the Boreal Shield East ecological boundary of Ontario). CBM-CFS3 is an aspatial, stand- and landscape-level modelling framework used for modelling various carbon pools on an annual basis.

The Carbon Budget Model, developed for the Canadian forest sector (CBM-CFS3) is an empirical model which estimates forest carbon stocks and changes at the stand or landscape level required under the United Nations Framework Convention on Climate Change (Kurz et al., 2009)[34]. This model uses algorithms to track the amount of carbon transferred to the five different carbon pools (above and below ground biomass, dead organic matter (DOM; litter and dead wood) and mineral soil), the atmosphere, and harvested wood products. It is compliant with the Good Practice Guidelines of the Intergovernmental Panel on Climate Change. The model uses information such as forest inventory, growth, and yield curves, natural and human-induced disturbance information, forest management schedule, and land-use. The Archive Index Database (AIDB) in CBM-CFS3 stores default administrative and ecological functions, and parameters applicable to the ecozone. The model is flexible and has been adapted and applied to forests around the world in support of scientific research and decision making.

Biomass Carbon Modeling

Total biomass carbon stock for the operable project area was calculated using equations embedded in the CBM-CFS3 and representative growth and yield curves and tracked by carbon pool as described in 2019 CBM-CFS3 user guide (Kull et al., 2019)[35]. The model simulates detailed forest growth and development over time and links this forest development to biomass accumulation and decay functions to track carbon biomass by pool through time. The CBM-CFS3 converts the merchantable volume per ha reported by the growth curves (i.e., yield tables) to tonnes of biomass through species-specific allometric equations from Boudewyn et al., (2007)[36]. Below-ground biomass is calculated from the above-ground estimations using Li et al., (2003)[37] equations. The model uses a default value of 0.5 to convert biomass (t) to carbon (tC). All model outputs are in tonnes of Carbon (tC).

CBM-CFS3 meets the following suitability criteria in accordance with the methodology:

1. Well established (i.e., have been under continuous use and development for 10 years or longer).

34 Kurz et al., 2009: CBM-CFS3: a model of carbon-dynamics in forestry and land-use change implementing IPCC standards. Journal of Ecological Modelling 220(4): 480-504. https://cfs.nrcan.gc.ca/publications?id=29137

35 Kull, S.J.; Rampley, G.J.; Morken, S.; Metsaranta, J.; Neilson, E.T.; Kurz, W.A. 2019. Operational-scale Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3) version 1.2: user's guide. Natural Resources Canada, Canada Forest Services, North Forest Centre, Edmonton, AB.

36 Boudewyn, P.A.; Song, X.; Magnussen, S.; Gillis, M.D. 2007. Model-based, volume-to-biomass conversion for forested and vegetated land in Canada. Natural Resources Canada., Canada Forest Services, Pacific Forest Centre, Victoria, BC. Inf. Rep. BC-X-411.

37 Li, Z.; Kurz, W.A.; Apps, M.J.; Beukema, S.J. Belowground biomass dynamics in the Carbon Budget Model of the Canadian Forest Sector: Recent improvements and implications for the estimation of NPP and NEP. Canadian. Journal of Forest Resource. 2003, 33, 126–136.

2. Generate values on an annual basis, or at intervals not exceeding 10 years.

3. Include a reasonable representation of mortality from stand-self thinning and natural disturbance agents that are regionally appropriate. Adjustments may need to be made to account for these factors if they are not well represented. Rationale will be provided when making adjustments.

4. Output data are expressed in carbon units (tC) and are calculated for each of the required carbon pools (See Table 4).As per the methodology, expansion factors may be applied when used in combination with growth and yield model(s), when based upon regionally specific studies and applied only for the appropriate region and species. This project uses growth and yield curves prepared for the Project Area along with harvest volume prepared for the Project Area and size of Project Area.

5. Well documented and expert reviewed. These include (a) ongoing publications in peer-reviewed scientific journals, (b) documented reviews by expert practitioners in forestry/biology/ecology, and (c) approved by government for use in forest management activities.

6. Parameterized, calibrated, and tested for the specific conditions of the project.

7. Documented as appropriate for simulating the ecological and management scenarios that define the baseline and project case.

8. Is a model that simulates carbon dynamics directly at the stand-level and in the case of landscape models (i.e. forest estate models), be driven by inputs from the stand level.

9. Requires input from a growth and yield model commonly used to project productivity in managed and unmanaged forest stands.

Custom growth and yield curves were developed for the project and were informed both by the well-established provincial MIST data (development began in 2008 and has been continuously used and developed with 2022 being the latest update), and using data from the permanent calibration plots established throughout the Project Area. MIST generates values at 5 year increments, well documented and expert reviewed, parameterized, calibrated and tested for Ontario's Boreal and Great Lakes-St. Lawrence forest zones (the Project Area lies within the Great Lakes-St. Lawrence forest zone), and is documented as appropriate for simulating growth and yield of the ecological and management scenarios that define the baseline and project case. Additional details on the growth and yield curves developed for this project can be found in the McClean Forest Resource Management Report.

Stand type is matched with the appropriate growth and yield curve for modelling in CBM-CFS3 for each polygon in the project inventory.

Calculating the Baseline Carbon Balance

Note: All VM0012 methodology equations and their calculations in CBM-CFS3 can be found in Appendix T.

The total annual carbon balance in year t for the baseline scenario (ΔCBSL,t) is calculated using Equation 1 of VM0012, which is equal to the annual change in carbon stocks in all eligible pools in the baseline across the project activity area.

The annual change in carbon stocks in all pools in the baseline across the project activity area (ΔCBSL,P,t) is calculated using Equation 2, which is made up of the annual change in carbon stocks in above- and belowground living tree biomass (ΔCBSL,LB,t), dead organic matter (ΔCBSL,DOM,t), and harvest wood products (ΔCBSI,HWP,t).

The annual change in carbon stocks in living tree biomass (above- and belowground) (ΔCBSL,LB,t) is calculated using Equation 3 by accounting for live biomass gain (ΔCBSL,G,t) and live biomass loss (ΔCBSL,L,t); however, this equation is not applicable because the outputs of the CBM-CFS3 model for carbon stocks in living tree biomass (above- and belowground) already accounts for live biomass gain and loss (see Live Biomass Gain and Live Biomass Loss sections below).

Live Biomass Gain

The annual increase in tree carbon stock from growth (ΔCBSL,G,t) is defined by Equation 4; however the function of this equation is already integrated within the CBM-CFS3 modelling. Instead of utilizing the annual increment rate in tree biomass (tdm/ha/yr), (GBSL,i,t) and applying the carbon fraction of dry matter tC/tdm (CF), for each area (ha) of forest land (ABSL,i); the model utilizes the merchantable growth and yield curve and applies integrated species- and region-specific expansion factors to estimate tonnes of carbon that would have been gained from forest growth. This model process is in accordance with VM0012 in utilizing growth and yield models where output is in the form of an annual merchantable timber volume and converted using a series of expansion factors representing each carbon pool.
Live biomass gain (ΔCBSL,G,t, Equations 4, 5a-b) is calculated by CBM-CFS3 for the Project Area and analysis units using region specific forest dynamics parameters (Ontario as an Administrative unit & Boreal Shield East as Ecological zone for this project), and the related growth and yield curves, and reported by live biomass carbon pools (e.g. Aboveground Live, Belowground Live). Additional details about related model default values, functionality, and parameters are found in Kurz et. al., (2009) & Kull et al., (2019). Biomass Equations are embedded within the CBM-CFS3 model. The only alteration to the model that could affect parameters described above would be to alter the Ecological Boundary (i.e., the default Spatial Unit) of the model. All CBM-CFS3 simulations for the Project were completed utilizing parameters consistent with the Ontario Boreal Shield East Spatial Unit.

Live Biomass Loss

Equation 6: After the carbon stocks are estimated in equation 7, 8, 9 Equation 6 is applied according to the VM0012 methodology. Equation 7: LB_{BSL},i,t is calculated in Equation 5a as explained in section 1.1 by CBM-CFS3. fBSL,NATURAL,i,t is the biomass turnover in the model and the CBM-CFS3 uses biomass turnover to represent natural mortality of biomass. Ecosystem processes represented by these parameters include tree stem, foliage, branch, and root mortality. The model estimates biomass turnover using annual biomass turnover rates (% mortality per year). After the CBM-CFS3 estimates biomass turnover, it uses litterfall transfer rates to assign the carbon to different DOM pools as specified in the model's structure (Kurz et al., 2009).

Equation 8: Equations 4 and 5 (a & b) calculates (ΔCBSL,G,t) when harvesting (clearcut without salvage, partial harvesting, and overstory removal) is applied as disturbance event in CBM-CFS3. The proportion of biomass removed by harvesting from the stands in Equation 8 is calculated by Equation 4 and 5(a & b). The remaining carbon removed from the biomass pools is transferred to the respective DOM pools".

Equation 9: This parameter value is set at zero. However, creation of roads (2% of harvested area transitions to 0% growth rate, i.e., roads and landings) is accounted for harvest infrastructure. The biomass removed, however, contributes to the harvested wood pool. This is done for clearcut stands only, and only for the first stand entry. CBM-CFS3 estimates the biomass loss because of "creation of non-Forest (roads) and this change will be reflected via Equations 4 and 5 (a & b).

The simple flow of CBM-CFS3 is that the simulation of growth causes carbon to enter the forest ecosystem as living biomass (net biomass gain; Aboveground and belowground biomass carbon). Simulation of turnover and disturbance processes causes the transfers of carbon from biomass to the dead organic mater (DOM) pools. Natural disturbances can cause the loss of carbon for the ecosystem (wildfire, insects etc.), harvesting and "roads and landings" causes the loss of carbon from the ecosystem to the atmosphere and forest products. Therefore, the CBM-CFS3 Outputs: biomass carbon (Aboveground + Belowground), DOM incorporates the increment due to growth and losses due to disturbances and biomass turnover for natural mortality. Hence, Equation 6-9 are calculated in Equations 4, 5 (a & b).

Dead Organic Matter Dynamics

Dead organic matter dynamics (ΔCBSLDOM,t, Equation 10, 11a-b, 12, 13, 14a-b, 15, 16, 17a-d) are calculated by CBM-CFS3 based on the project area stratifications, regionally specific forest dynamics and the related carbon curves discussed above. Default parameters and algorithms within the model track all stands dead wood dynamics, including standing dead, downed dead, and below ground dead organic matter. CBM-CFS3 uses the regionally specific variant data and related parameters to model and track dead wood carbon pools. Proportion of dead tree biomass

in CBM-CFS3 is calculated by combinations of jurisdiction-ecozone-predominant genus-volume centile (Boudewyn et al., 2007).

The annual change in carbon stocks in DOM (ΔCBSL,DOM,t) is calculated by Equation 10 as the summation of change in lying dead wood (LDW), snag, and dead belowground biomass carbon stocks (ΔCBSL,LDW,t, ΔCBSL,SNAG,t, and ΔCBSL,DBG,t, respectively).

Change in Lying Dead Wood (LDW) Carbon Stocks

The change in lying dead wood (LDW) carbon stocks (ΔCBSL,LDW,t) is defined by Equations 11a and 11b, which applies the carbon fraction (CF) to the annual increase and decrease in LDW biomass (LDWBSL,IN,i,t, and LDWBSL,OUT,i,t, respectively) to the total mass of lying dead wood accumulated (LDWBSL,i,t). However, the function of these equations is already integrated within the CBM-CFS3 modelling (below).

In Equation 12 (which is input into Equations 11a and 11b), the annual increase in LDW biomass (LDWBSL,IN,i,t) accounts for the annual loss of live tree biomass due to natural mortality, commercial felling, and from incidental sources (LBLBSL,NATURAL,i,t, LBLBSL,FELLINGS,i,t, and LBLBSL,OTHER,i,t, respectively) and applies annual proportions of live aboveground tree biomass subject to blowdown, aboveground tree biomass comprised of branches > 5 cm diameter, and the log bole biomass left on site after assessing and/or merchandizing the log bole for quality (fBSL,BLOWDOWN,i,t, fBSL,BRANCH,i,t, and fBSL,BUCKINGLOSS,i,t, respectively), and accounts for increases from the total mass of the snag pool (SNAGBSL,i,t) with application of an annual proportion of snag biomass that falls over and thus is transferred to the LDW pool (fBSL,SNAGFALLDOWN,i,t). Belowground biomass is excluded from this by utilizing the root:shoot ratio (Ri). The amount of increase to the lying dead wood pool (or select Aboveground DOM pools) is already accounted for in CBM-CFS3 with integrated parameters for carbon transfers from natural, felling, and infrastructure sources that are region- (in the case of natural) and management-specific (in the case of roads and infrastructure).

The annual loss in LDW biomass through decay (LDWBSL,OUT,i,t) is defined by Equation 13 (which is input into Equations 11a and 11b) as the annual proportional loss of lying dead biomass due to decay (fBSL,lwDECAY,i,t) applied to the total mass of lying dead wood accumulated (LDWBSL,i,t). This equation is unnecessary because the loss of lying dead biomass due to decay is integrated into CBM-CFS3 with region-specific decay (or turnover rates), and the total mass of lying dead wood (or select Aboveground DOM pools) of each stand is already calculated in tons of carbon each year by the model.

Change in Snag Carbon Stock

The change in snag carbon stock (ΔCBSL,SNAG,t) is defined by Equations 14a and 14b, which applies the carbon fraction (CF) to the annual gain in snag biomass (SNAGBSL,IN,i,t) and the annual loss in snag biomass through decay, or falldown (i.e, transfer to the LDW pool)

(SNAGBSL,OUT,i,t) to the total mass of snags accumulated (SNAGBSL,i,t). However, the function of these equations is already integrated within the CBM-CFS3 modelling (below).

In Equation 15 (which is input into Equations 14a and 14b, the annual gain in snag biomass (SNAGBSL,IN,i,t) is calculated by applying the proportion of live tree aboveground biomass that dies but remains as standing dead organic matter (i.e., snags) (1-fBSL,BLOWDOWN,i,t) to the annual loss of live tree biomass due to natural mortality (LBLBSL,NATURAL,i,t), and belowground biomass is excluded using the root:shoot ratio (Ri). This equation is unnecessary as the amount of increase to the snags pool (or Softwood/Hardwood Stem/Branch Snag pools) is already accounted for in CBM-CFS3 with integrated parameters for carbon transfers from natural causes that are region-specific.

The annual loss in snag biomass through decay, or falldown (i.e, transfer to the LDW pool) (SNAGBSL,OUT,i,t) is defined by Equation 16 (which is input into Equations 14a and 14b) as the annual proportional loss of snag biomass due to decay (fBSL,SWDECAY,i,t) and the annual proportion of snag biomass that falls over and thus is transferred to the LDW pool (fBSL,SNAGFALLDOWN,i,t) applied to the total mass of snags accumulated (SNAGBSL,i,t). This equation is unnecessary because the annual loss in snag biomass through decay, or falldown is integrated into CBM-CFS3 with region-specific decay and transfer rates, and the total mass of snags accumulated (or Softwood/Hardwood Stem/Branch Snag pools) in each stand is already calculated in tons of carbon each year by the model.

Annual Change in DOM Derived from Dead Belowground Biomass

The annual change in DOM derived from dead belowground biomass (ΔCBSL,DBG,t) is defined by Equations 17a and 17b, which applies the carbon fraction (CF) to the annual gain in dead belowground biomass (DBGBSL,IN,i,t) and the annual loss in dead belowground biomass through decay (DBGBSL,OUT,i,t) to the total quantity of dead belowground biomass accumulated (DBGBSL,i,t). However, the function of these equations is already integrated within the CBM-CFS3 modelling (below).

In Equation 17c (which is input into Equations 17a and 17b), the annual gain in dead belowground biomass (DBGBSL,IN,i,t) is calculated by applying annual proportion of biomass that dies from natural mortality, biomass removed by harvesting, and additional biomass removed for road and landing construction (fBSL,NATURAL,i,t, fBSL,HARVEST,i,t, and fBSL,DAMAGE,i,t, respectively) to the belowground portion of average live tree biomass (LBBSL,i,t) using the root:shoot: ratio (Ri) for the area (ha) of forest land (ABSL,i). This equation is unnecessary as the amount of increase to the dead belowground biomass pool (or select Belowground DOM pools) is already accounted for in CBM-CFS3 with integrated parameters for carbon transfers from natural, harvesting, and infrastructure sources that are region- (in the case of natural) and management-specific (in the case of harvesting and infrastructure).

The annual loss in dead belowground biomass through decay (DBGBSL,OUT,i,t) is defined by Equation 17d (which is input into Equation 17a and 17b) as the annual proportional loss of dead

belowground biomass due to decay (fBSL,dgbDECAY,i,t) applied to the total quantity of dead belowground biomass accumulated (DBGBSL,i,t). This equation is unnecessary because the loss in dead belowground biomass through decay is integrated into CBM-CFS3 with region-specific decay (or turnover rates), and the total quantity of dead belowground biomass accumulated (or select Belowground DOM pools) in each stand is already calculated in tons of carbon each year by the model.

In summary, Equation 10 was used to calculate the annual change in carbon stocks in DOM (made up of the change in lying dead wood (LDW), snag, and dead belowground biomass carbon stocks).

Total biomass (Aboveground + Belowground) carbon stocks for the stand were calculated (BTOTAL,i,t: Equation 28b-d) using equations embedded in the CBM-CFS3 and output by representative carbon curves and tracked by individual carbon pools as described in 2019 CBM-CFS3 user guide (Kull et al., 2019)[35]. The CBM-CFS3 converts the merchantable volume per ha reported by the growth curves (i.e., yield tables) to tonnes of carbon through species-specific allometric equations (Boudewyn et al., 2007)[36]. Below-ground biomass is calculated from the above-ground estimations using Li et al., (2003)[37] equations.

Harvested Wood Products

The annual change emissions associated with the production of harvested wood products (HWP) (ΔCBSL,HWP,t) is calculated using Equation 18 by accounting for the annual change in harvested carbon that remains in storage after conversion to wood products (ΔCBSL,STORHWP,t). This project accounts for the annual change in fossil fuel emissions from harvesting (logging and log transport) and processing of the various wood products (ΔCBSL,EMITFOSSIL,t). The project uses the default values provided in the methodology (table 4 of VM0012) and professional opinion by a Registered Professional Foresters regarding the local log market.

Carbon Storage in Harvested Wood Products

The annual change in harvested carbon that remains in storage after conversion to wood products (ΔCBSL,STORHWP,t) is calculated using Equation 19 by calculating the carbon storage in harvested wood products at time 2 and time 1 divided by the number of years between monitoring time 1 and 2 (T). To calculate the carbon storage in harvested wood products, the carbon contained in timber harvested must first be calculated (see Equation 20 below).

Equation 20 defines the carbon contained in timber harvested (CBSL,TIMBER,h) by applying the proportion of live tree biomass remaining after netting out branch biomass (1-fBSL,BRANCH,i,t) and the proportion of the log bole remaining after in-woods log processing/bucking for quality, length, etc. (1-fBSL,BUCKINGLOSS,i,t) to the annual loss of live tree biomass due to commercial

felling (LBLBSL,FELLINGS,i,t) and the annual loss of live tree biomass from incidental sources (LBLBSL,OTHER,i,t), excluding the belowground biomass portion using the root:shoot ratio (Ri). However, this equation is unnecessary because CBM-CFS3 provides the total harvest carbon pool, which is the transfer of carbon from the ecosystem pools to the forest product sector, using management-specific parameters for harvesting and infrastructure disturbances, and includes the carbon harvested from snags (if appropriate, but not applied in this project). Therefore, the carbon contained in timber harvested (CBSL,TIMBER,h) is provided by CBM-CFS3.

Using this, the carbon contained in harvested timber after milling for each product type, k can be calculated. VM0012 methodology provides an equation (Equation 21) to calculate amount of carbon contained in harvested timber after milling. However, Equation 21 has been determined to be flawed and a deviation has been applied (with guidance and approval from Verra to apply a deviation to this equation).

The original Equation 21 resulted in more carbon present after milling due to the ratio of pulp being higher than 1. Equation 21 applies the fraction of growing stock volume removed as roundwood for product type k (fRND,k), and the ratio of industrial roundwood to growing stock volume removed as roundwood for product type k (rRND,k) to the carbon contained in timber harvested for product type k (CBSL,TIMBER,h,k). As the ratio is greater than 1 for pulp product, the final output (CBSL,MILL,h,k) is greater than the initial starting value. It is not reasonable nor accurate for the amount of carbon present after milling to be greater than the amount of carbon present prior to milling. As such, a deviation has been applied. This deviation is detailed in Section 3.6 Methodology Deviation: Equation 21 regarding the amount of carbon contained in a harvested wood product after milling.

The purpose of equation 21 is to determine the amount of carbon contained in a harvested wood product after milling.

The project fulfills the goal of equation 21 by determining and applying conversion factors to convert from weight of carbon harvested (a CBM output) to harvested wood product carbon. This is performed as follows:

1. CBM output of Mg C in harvested wood leaving the site (CBSL,TIMBER,h,k);
2. This CBM output is then apportioned into product category (softwood or hardwood) carbon (SW, HW);
3. Carbon contained in harvested wood product (mechanical pulp, chemical pulp, and sawtimber) is then obtained by multiplying product category carbon (e.g., softwood carbon) by scenario (Project, Baseline) and product-type specific conversion factors per the below table:

	FACTORS (HWP C/Harvested C)					
	SW Mech Pulp	SW Chem Pulp	SW Saw	HW Mech Pulp	HW Chem Pulp	HW Saw

Project	0.27	0.00	0.26	0.00	0.23	0.05
Baseline	0.27	0.00	0.26	0.00	0.22	0.04

The product-type specific conversion factors were derived as follows:

1. Proportion of carbon harvested by species, calculated as total species-specific carbon harvested and leaving the site over entire crediting period (CBM output) divided by total carbon harvested (softwood and hardwood) leaving the site over entire crediting period (CBM output);

2. Species-specific carbon is converted to green volume since UNEC (2010) literature on conversion efficiency to final wood products are expressed as ratios of green volume input to product output:

    a) Convert species-specific carbon to species-specific wood + bark volume:

        i. CBM's harvested carbon includes carbon in both wood and bark, necessitating a conversion to green volume that includes both wood and bark;

        ii. Volume (wood + bark) to biomass relationships are derived from species-specific statistics from Miles & Smith 2009, and biomass to carbon relationship is IPCC standard of 0.5 Mg C/Mg biomass (refer to "Species_Specific_GMVtoCarbonConversion.xlsx", worksheet "GreenVolBasis") – e.g., Balsam Fir = 0.189 Mg C/m^3 of wood + bark.

        iii. Divide species-specific carbon by species-specific ratio of carbon to volume to obtain total volume of balsam fir wood + bark removed from site.

    b) Convert species-specific wood + bark volume to roundwood volume (volume without bark) by removing bark volume:

        i. Bark volume as percent of volume (wood + bark) is derived from species-specific statistics from Miles & Smith 2009 (refer to "Species_Specific_GMVtoCarbonConversion.xlsx", worksheet "GreenVolBasis") – e.g., Balsam Fir = 12.25%

        ii. Roundwood volume = (wood + bark volume) – bark volume

3. Separate roundwood volume (softwood and hardwood separately) into wood product destination (pulpwood vs. sawtimber):

        i. Product destination derived from historical harvest records under previous ownership (see "TFG HW and SW harvest totals.xlsx"):

Wood product type k	**Proportion within SW or HW**
Softwood saw log	69.40%

Softwood pulpwood	30.60%
	100.00%
Hardwood saw log	9.70%
Hardwood pulpwood	90.30%
	100.00%

4. Separate roundwood volume destined for pulpwood into mechanical pulpwood and chemical pulpwood streams (separation based on pulpmill destinations of pulpwood under previous ownership – see "Painted_Pulp_Process_RFP_Opinion.pdf".

	Mechanical Pulping as % of Pulp	Chemical Pulping as % of Pulp
Softwood	100%	0%
Hardwood	0%	100%

5. Account for conversion efficiency to final product per UNECE (2010):

   a) Pulpwood (roundwood volume to biomass conversion):

      i. Per Summary Table 6.2 – Wood Pulp and Paper (UNECE 2010), the ratio of roundwood to weight of pulp (at 10% moisture content) is presented. The inverse is used for conversion of volume to Mg 10% moisture content pulp.

      ii. Per section 6.1, "Pulp and paper measurement is usually handled via weight. Generally, an unspecified metric ton or an "air dried metric ton" is assumed to be 10% mcw. Note that pulp and paper moisture content is reflected on a "wet basis" (mcw), i.e. one air-dried metric ton of pulp is assumed to be 900 kg of oven dry fibre and 100 kg of contained water." Therefore, pulpwood biomass = 0.90 * (Mg pulpwood @ 10% moisture content/m^3 roundwood).

      iii. Pulpwood biomass (Mg biomass) is converted to Mg C using a carbon fraction of 0.5 (IPCC default value consistent with VM0012 methodology).

	Table 6.2 values @ 10% moisture content m^3 roundwood/ Mg	Inverse of Table 6.2 values Mg/ m^3 roundwood	Conversion to biomass through removal of 10% Water weight Mg oven-dry/ m^3 roundwood
Mechanical	2.39	0.418410042	0.376569038
Chemical	5.22	0.191570881	0.172413793

b) Sawtimber - conversion to product volume, then to product biomass:

i. Roundwood volume to product volume conversion:

I. Per Summary Table 3.4 – Sawnwood (UNECE 2010), sawnwood conversion efficiency is reported as m^3 roundwood (green volume basis) per m^3 product. Roundwood volume (conifer or non-conifer/hardwood) is multiplied by the inverse of the former:

	m^3 roundwood/ m^3 product	m^3 product/ m^3 roundwood
Conifer	2.22	0.45
Non-conifer	1.96	0.51

c) Sawtimber product volume conversion to product carbon:

i. Section 3 of UNECE (2010) indicates that North America reports sawnwood product volumes in final state of manufacture (not on a green volume basis). This requires that conversion from sawnwood product volume to biomass account for the lower moisture content of the product. Miles & Smith (2009) offer specific gravity on a 12% moisture content basis, and these values were used in this case. Species-specific sawtimber product volumes are converted to biomass using volume (wood only, no bark) to biomass relationships derived from the specific gravity and oven-dry weight of wood by species on a 12% moisture content basis. This is then translated into a single conversion factor per species that converts from volume of product to Mg carbon (refer to "Species_Specific_GMVtoCarbonConversion.xlsx", worksheet "12%MCVolBasis") – e.g., Balsam Fir = 0.175 Mg C/m^3 of 12% moisture content wood. Note, the Miles & Smith 2009 values used relate to oven-dry weight of wood on a 12% moisture content volume basis.

6. Harvested Wood Product (HWP) carbon fraction calculation:

a) HWP/harvested carbon fractions were calculated separately for Softwood and Hardwood for each product pool (Mechanical Pulp, Chemical Pulp, Sawtimber).

b) Each fraction was calculated by dividing the sum of all carbon in HWP in a given wood product type and category over the entire crediting period (e.g., HWP carbon within Softwood Mechanical Pulp) by the total carbon harvested within a given wood product category (e.g., Softwood carbon harvested) over the entire crediting period.

	FACTORS (HWP C/Harvested C)

	SW Mech Pulp	SW Chem Pulp	SW Saw	HW Mech Pulp	HW Chem Pulp	HW Saw
Project	0.27	0.00	0.26	0.00	0.23	0.05
Baseline	0.27	0.00	0.26	0.00	0.22	0.04

7. For each crediting year, the transfer of carbon to HWP type was calculated as the total harvested carbon per product category (SW or HW) multiplied the respective product type fraction noted above.

    a) As an example, if in a given year a total of 300 Mg of C were harvested in the baseline scenario, with 100 Mg C from SW and 200 Mg C from HW, then we have the following carbon ending up in HWP:

        i. Softwood:

            I. Mechanical pulp: 100 Mg C * 0.27 = 27 Mg C

            II. Chemical pulp: 100 Mg C * 0.00 = 0 Mg C

            III. Sawtimber: 100 Mg C * 0.26 = 26 Mg C

        ii. Hardwood:

            I. Mechanical pulp: 200 Mg C * 0 = 0 Mg C

            II. Chemical pulp: 200 Mg C * 0.22 = 44 Mg C

            III. Sawtimber: 200 Mg C * 0.05 = 10 Mg C

    The sum of all of the above wood products is CBSL,MILL,h,k per the VM0012 methodology. All subsequent calculations are performed according to the VM0012 methodology, by applying the long-lived factor, medium-lived factor and the immediate release of short-lived factor (equation 23).

    Following the calculation of CBSL,MILL,h,k, the short-, long-, and medium-lived fractions are then calculated for each product type (see Equations 22a, 22b, and 22c below).

    Equation 22a is used to calculate the short-lived fraction (PBSL,SLF,k) as harvested wood products and wood waste that will decay within 3 years (1-P3-year). Equation 22b is used to calculate the long- lived fraction (PBSL,LLF,k) as harvested wood products and wood waste that may be considered permanent (stored for 100 years or more) (P100-year). Equation 22c is used to calculate the medium-lived fraction (PBSL,MLF,k) as harvested wood products and wood waste that will be retired between 3 and 100 years from the date of harvest (P3-year - P100-year). Each category of wood products (k) stores carbon according to the following rules:

    i. Short-lived wood products – immediate emission of all carbon upon harvest

ii. Medium-lived wood products – no emission of carbon upon harvest, but carbon stored will decrease by 1/20th for the next 20 years after harvest, such that after 20 years the term becomes zero

iii. Long-lived wood products – no loss of carbon.

Finally, Equation 23 is used to calculate the carbon stored in harvested wood products in each year summed for all product types (k) and then over all harvest periods (h) (CBSL,STORHWP,t) by applying the medium-lived fraction with a 20-year linear decay rate (PBSL,MLF,k), and the long-lived fraction with no loss of carbon (PBSL,LLF,k), to the carbon contained in harvested timber after milling in each period (h), for each product type (k) (CBSL,MILL,h,k).

Fossil Fuel Emissions Associated with Logging, Transport, and Manufacture

The annual change in fossil fuel emissions from harvesting and processing of the various wood products is accounted in this project. Therefore, Equations 24, 25, 26, and 27 are applicable and included in the VM0012 workbook ("VM0012_Workbook_Painted_FINAL_12_16_2024.xlsx") and apply the default values located in Table 4 of the VM0012 methodology.

The various VCS pool and the related CBM-CFS3 pools are presented in Table 10.

Table 10. VCS Pools and associated CBM Pools

VCS Pool	Description	CBM-CFS3 Pool	CBM-CFS3 Description
Live Biomass	Aboveground & Belowground Biomass	Biomass	Carbon in the aboveground and belowground biomass pools
DOM Above-ground	Deadwood Pool	Medium DOM	Carbon in DOM with input from merchantable stem wood and/or stem snags; medium turnover rate
Snag		Softwood Stem Snag	Carbon in DOM with input from the Softwood Merchantable biomass pool; default decay rate is half the default decay rate for the medium pool to the softwood stem snag pool
		Softwood Branch Snag	Carbon in DOM with input from the Softwood Other biomass pool; default decay rate is half

			the default decay rate for the fast pool to the softwood branch snag pool
		Hardwood Stem Snag	Carbon in DOM with input from the Hardwood Merchantable biomass pool; default decay rate is half the default decay rate for the medium pool to the hardwood stem snag pool
		Hardwood Branch Snag	Carbon in DOM with input from the Hardwood Other biomass pool; default decay rate is half the default decay rate for the fast pool
DOM Below-ground		Belowground Fast DOM	Carbon in DOM with input from coarse roots; fast turnover rate
HWP	Wood Products Pool	Total Harvest	Total transfer of carbon from the ecosystem pools to the forest product sector

5.2 Project Emissions

Net project emissions were calculated by repeating the procedures in the baseline emissions calculations in Section 4.1 above.

The project scenario involves a reduction in annual harvest of 90% across the Project Area, compared to the baseline scenario, with up to a maximum of 10% of the baseline harvest volume allowed for project scenario forest health activities.

Project Scenario Area Stratification

The same inventory data and stratification methods were used for the project scenario as the baseline scenario as described in Section 4.1 above.

Determining Actual Onsite Carbon Stocks

Actual carbon stocks are calculated prior to each verification (at a maximum interval of 5 years) by updating the project's forest carbon inventory from monitoring data.

In accordance with the methodology, this is done by:

1. Incorporating any new forest inventory data obtained during the previous year into the inventory estimate.

2. Updating the forest inventory for spatial monitoring results, including annual project activities and/or disturbances that have occurred during the monitoring period.
3. Using the selected model(s) to project prior-year data from the forest inventory to the current reporting year (as described in Section 8.2.5 of VM0012).
4. Comparing estimates of live biomass and dead organic matter in polygons and calculated from monitoring activities (Section 9.2 and 9.3 of VM0012) against current-year modelled values in the project scenario (see Section 8.2.4 of VM0012).
5. Making calibration adjustments to models and/or parameters such that the fit between the equivalent modelled and measured variables meets targets (as per Section 8.2.4 of VM0012).
6. If any changes are made to the model assumptions or parameters used in Section 8.2, the calculation of baseline emissions (from the current date forward) must be redone using the updated model(s) and parameter sets.
7. Calculate the error terms for use in determining the uncertainty factor (Section 8.5.3 of VM0012).

Ex-Post Calculations of Carbon Stocks

Equations 28a, 28b, 28c, 28d, and 28e were used to calculate the actual carbon stocks.

Updating the Modelled Project Carbon Balance

The precision of the modelled carbon stocks will be evaluated for each polygon using the method described in Section 8.5.3 (Equations 60a and 60b) of VM0012. In accordance with the methodology, if changes in model assumptions or parameters are made, the baseline scenario (from the next year forward) must be recalculated using the revised model.

Calculating the Project Carbon Balance

Note: All VM0012 methodology equations and their calculations in CBM-CFS3 can be found in Appendix T.

The total annual carbon balance for the project scenario is calculated using Equation 29, which is equal to the annual change in carbon stocks in all pools in the project across the project activity area ($\Delta C_{PRJ,P,t}$).

The annual change in carbon stocks in all pools in the project across the project activity area ($\Delta C_{PRJ,P,t}$) is calculated using Equation 30 by summation of the annual change in carbon stocks in living tree biomass (above- and belowground), in dead organic matter, and associated with harvested wood products ($\Delta C_{PRJ,LB,t}$, $\Delta C_{PRJ,DOM,t}$, and $\Delta C_{PRJ,HWP,t}$, respectively).

Equation 32 defines the annual change in carbon stocks in living tree biomass (above- and belowground) (ΔCPRJ,LB,t) as the annual increase in tree carbon stock from growth (ΔCPRJ,G,t) and the annual decrease in tree carbon stock from a reduction in live biomass (ΔCPRJ,L,t). However, this equation is not applicable because the outputs of the CBM-CFS3 model for carbon stocks in living tree biomass (above- and belowground) already accounts for live biomass gain and loss (see Live Biomass Gain and Live Biomass Loss sections below).

Equations 29, 30, 31, 32, 33 (a, b), 34,35, 36, 37, 38, 39 (a, b) 40, 21, 42 (a, b), 43, 44, 45 (a, b, c, d), 46, 47, 48, 48 are the live biomass gain, live biomass loss and dead organic matter dynamics for Project scenario and these equations are calculated as Baseline scenarios from Equations (1-27) which is explained above in Section 5.1.

Harvested Wood Products

The annual change emissions associated with the production of harvested wood products (HWP) (ΔCPRJ,HWP,t) is calculated using Equation 46 by accounting for the annual change in harvested carbon that remains in storage after conversion to wood products (ΔCPRJ,STORHWP,t). This project accounts for the annual change in fossil fuel emissions from harvesting (logging and log transport) and processing of the various wood products (ΔCPRJ,EMITFOSSIL,t). Log transport occurs via truck and rail due to the location of the Project Area and close proximity to rail lines. The default values for the carbon emission intensity factors for harvesting were provided by Table 4 in the VM0012 methodology.

Carbon Storage Harvested Wood Products

The calculation of carbon storage in harvested wood products for the project emissions applied the same process from the baseline emissions (see Section 4.2).

Equation 47 is used to calculate annual change in harvested carbon that remains in storage after conversion to wood products (ΔCPRJ,STORHWP,t).

Equation 48 is unnecessary because the carbon contained in timber harvested (CPRJ,TIMBER,h) is provided by CBM-CFS3.

Equation 49 is used to calculate the carbon contained in harvested timber after milling in each period (h), for each product type (k) (CPRJ,MILL,h,k).

Equation 50a, 50b, and 50c, are used to calculate the short-lived fraction (PPRJ,SLF,k), long-lived faction (PPRJ,LLF,k), and medium-lived fraction (PPRJ,MLF,k), respectively.

Finally, Equation 51 is used to calculate carbon stored in harvested wood products summed for all product types k and then over all harvest periods h (CPRJ,STORHWP,t).

Fossil Fuel Emissions Associated with Logging, Transport, and Manufacture

The annual change in fossil fuel emissions from harvesting and processing of the various wood products is accounted for in this project. Therefore, Equations 52, 53, 54, and 55 are applicable. The equations apply the carbon emission intensity factors for manufacturing of various product categories and for various transportation categories from Table 4 in the VM0012 methodology.

5.3 Leakage Emissions

Activity Shifting Leakage

The project proponent owns multiple properties within Canada and will annually provide validators and/or verifiers the locations and descriptions of all forestland properties.

In accordance with applicability conditions for the methodology, the project proponent will demonstrate annually that there is no negative activity shifting leakage to other properties operated by the project proponent as a result of the project activity (i.e., harvest rates have not been increased). Evidence will include:

1. Historical records showing trends in harvest volumes (including mill receipts) paired with records from the project time period showing no deviation from historical trends, or

2. Forest management plans prepared ≥ 24 months prior to the start of the project showing harvest plans on all owned/managed lands paired with records from the project time period showing no deviation from management plans.

3. Change detection analysis of the properties owned by Perimeter Forest to demonstrate that baseline harvest activities from the Painted Forest have not shifted to these other properties during each monitoring period and throughout the project period (please see Appendix R for methodology).

Market Leakage

The market leakage factor (MLFy) is calculated to be 15.30% using the VM0012 Market Leakage Option 3 – Leakage Assessment Tool, in accordance with the methodology. Leakage is assessed from publicly available data from the forest wood products market, which is used to identify where leakage risk is most likely to be leaked to (or replaced from). This allows for a more detailed assessment of leakage (compared to other options) for its weighing into different biomass areas, and to separate domestic versus international leakage proportions. The leakage assessment is provided in "VM0012_Workbook_Painted_FINAL_12_16_2024.xlsx".

Market leakage is calculated according to equation 56d: $LE_y = MLF_y \times ER_y$, GROSS

5.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals

The quantification of net GHG emissions reductions and removals is below.

Regarding permanence of the carbon stocks: the crediting period is 100 years, which is the full crediting period allowable by Verra and meets the minimum project longevity requirement of 40 years, and there is no final cut planned within the project scenario or following completion of the crediting period.

Note: VM0012 does not allow for the separate quantification of removals and reductions

Vintage period	Estimated baseline emissions (tCO_2e)	Estimated project emissions (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated buffer pool allocation (tCO_2e)	Estimated reduction VCUs (tCO_2e)	Estimated removal VCUs (tCO_2e)	Estimated total VCU issuance (tCO_2e)
02-September-2021 to 31-December-2021	86,795	-	14,677	10,415			69,530
01-January-2022 to 31-December-2022	133,946	-90,614	37,894	26,947			179,470
01-January-2023 to 31-December-2023	140,090	-64,619	34,478	24,565			163,242
01-January-2024 to 31-December-2024	145,897	-61,620	34,861	24,902			164,995
01-January-2025 to 31-December-2025	151,857	-57,452	35,105	25,117			166,107
01-January-2026 to 31-December-2026	161,861	-55,372	36,371	26,068			172,053
01-January-2027 to 31-December-2027	169,912	-52,406	37,179	26,678			175,844
01-January-2028 to 31-December-2028	191,189	-51,667	40,465	29,143			191,284
01-January-2029 to 31-December-2029	218,371	-49,001	44,523	32,085			210,445
01-January-2030 to 31-December-2030	223,056	-45,943	44,738	32,280			211,422
01-January-2031 to 31-December-2031	122,443	-53,824	29,142	21,152			137,595
01-January-2032 to 31-December-2032	119,900	-51,776	28,352	20,601			133,844
01-January-2033 to 31-December-2033	121,818	-50,347	28,429	20,660			134,206
01-January-2034 to 31-December-2034	124,187	-49,635	28,704	20,859			135,504
01-January-2035 to 31-December-2035	125,795	-47,991	28,709	20,854			135,536
01-January-2036 to 31-December-2036	128,494	-46,099	28,854	20,951			136,227
01-January-2037 to 31-December-2037	122,488	-42,897	27,282	19,846			128,771

01-January-2038 to 31-December-2038	125,563	-41,786	27,653	20,082			130,553
01-January-2039 to 31-December-2039	126,757	-41,668	27,855	20,211			131,525
01-January-2040 to 31-December-2040	127,212	-38,965	27,475	19,941			129,727
01-January-2041 to 31-December-2041	138,390	-38,482	29,302	21,225			138,397
01-January-2042 to 31-December-2042	127,192	-35,801	26,983	19,559			127,425
01-January-2043 to 31-December-2043	121,387	-34,018	25,813	18,649			121,961
01-January-2044 to 31-December-2044	115,991	-33,691	24,903	17,962			117,691
01-January-2045 to 31-December-2045	110,609	-32,188	23,835	17,136			112,698
01-January-2046 to 31-December-2046	110,419	-32,177	23,862	17,111			112,870
01-January-2047 to 31-December-2047	108,282	-31,286	23,407	16,748			110,757
01-January-2048 to 31-December-2048	114,545	-31,136	24,447	17,482			115,685
01-January-2049 to 31-December-2049	130,121	-30,301	26,905	19,251			127,309
01-January-2050 to 31-December-2050	126,640	-29,545	26,261	18,742			124,308
01-January-2051 to 31-December-2051	122,026	-29,070	25,464	18,132			120,577
01-January-2052 to 31-December-2052	116,616	-28,083	24,441	17,364			115,768
01-January-2053 to 31-December-2053	112,163	-27,792	23,755	16,795			112,603
01-January-2054 to 31-December-2054	108,427	-27,624	23,148	16,326			109,764
01-January-2055 to 31-December-2055	106,057	-26,647	22,637	15,925			107,382
01-January-2056 to 31-December-2056	104,453	-26,337	22,347	15,695			106,031
01-January-2057 to 31-December-2057	94,363	-25,576	20,607	14,393			97,855

01-January-2058 to 31-December-2058	93,257	-24,927	20,347	14,182			96,647
01-January-2059 to 31-December-2059	89,062	-24,451	19,630	13,622			93,301
01-January-2060 to 31-December-2060	86,501	-23,333	19,071	13,180			90,695
01-January-2061 to 31-December-2061	80,050	-22,963	18,038	12,362			85,887
01-January-2062 to 31-December-2062	68,435	-21,026	15,692	10,735			74,736
01-January-2063 to 31-December-2063	69,901	-23,343	16,337	11,189			77,796
01-January-2064 to 31-December-2064	69,787	-22,616	16,239	11,088			77,359
01-January-2065 to 31-December-2065	65,528	-21,751	15,411	10,474			73,465
01-January-2066 to 31-December-2066	48,521	-20,953	12,765	8,337			61,187
01-January-2067 to 31-December-2067	25,302	-20,035	9,212	5,440			44,723
01-January-2068 to 31-December-2068	40,899	-19,105	11,527	7,200			55,576
01-January-2069 to 31-December-2069	81,350	-18,080	17,351	11,932			82,574
01-January-2070 to 31-December-2070	80,344	-17,132	17,053	11,697			81,187
01-January-2071 to 31-December-2071	82,726	-16,279	17,348	11,881			82,610
01-January-2072 to 31-December-2072	36,206	-15,326	9,807	6,184			47,226
01-January-2073 to 31-December-2073	19,633	-14,309	7,019	4,073			34,147
01-January-2074 to 31-December-2074	15,122	-13,364	6,163	3,418			30,140
01-January-2075 to 31-December-2075	18,163	-12,376	6,561	3,665			32,060
01-January-2076 to 31-December-2076	12,387	-11,477	5,462	2,864			26,874
01-January-2077 to 31-December-2077	11,756	-10,533	5,215	2,675			25,716

01-January-2078 to 31-December-2078	13,408	-9,637	5,356	2,765			26,392
01-January-2079 to 31-December-2079	9,547	-8,781	4,618	2,199			22,937
01-January-2080 to 31-December-2080	7,377	-7,860	4,137	1,828			20,689
01-January-2081 to 31-December-2081	46,791	-7,072	10,371	6,464			50,015
01-January-2082 to 31-December-2082	78,093	-5,706	15,095	10,056			72,159
01-January-2083 to 31-December-2083	79,213	-3,696	14,978	9,949			71,628
01-January-2084 to 31-December-2084	77,077	-3,354	14,629	9,652			70,025
01-January-2085 to 31-December-2085	72,727	-2,867	13,883	9,071			66,539
01-January-2086 to 31-December-2086	50,695	-2,566	10,274	6,391			49,559
01-January-2087 to 31-December-2087	25,577	-2,225	6,218	3,336			30,517
01-January-2088 to 31-December-2088	31,142	-1,967	7,011	3,973			34,203
01-January-2089 to 31-December-2089	33,420	-1,746	7,325	4,220			35,666
01-January-2090 to 31-December-2090	35,107	-1,509	7,555	4,394			36,742
01-January-2091 to 31-December-2091	36,627	-1,371	7,746	4,560			37,621
01-January-2092 to 31-December-2092	45,264	-1,281	9,026	5,585			43,570
01-January-2093 to 31-December-2093	31,743	-1,120	7,092	3,944			34,673
01-January-2094 to 31-December-2094	50,454	-983	10,063	6,172			48,625
01-January-2095 to 31-December-2095	44,959	-858	9,214	5,498			44,675
01-January-2096 to 31-December-2096	18,620	-865	4,970	2,338			24,714
01-January-2097 to 31-December-2097	35,727	-815	7,752	4,385			37,826

01-January-2098 to 31-December-2098	44,562	-824	9,082	5,446			44,009
01-January-2099 to 31-December-2099	24,119	-833	5,851	2,994			28,857
01-January-2100 to 31-December-2100	27,237	-799	6,280	3,364			30,825
01-January-2101 to 31-December-2101	21,195	-683	5,292	2,625			26,185
01-January-2102 to 31-December-2102	18,851	1,039	4,753	2,137			23,732
01-January-2103 to 31-December-2103	14,696	-2,367	4,684	2,048			23,445
01-January-2104 to 31-December-2104	12,543	3,925	3,286	1,034			16,848
01-January-2105 to 31-December-2105	20,308	-1,527	5,481	2,620			27,214
01-January-2106 to 31-December-2106	43,196	2,264	8,564	4,912			41,718
01-January-2107 to 31-December-2107	42,548	4,001	8,152	4,626			39,760
01-January-2108 to 31-December-2108	47,785	-19	9,727	5,737			47,230
01-January-2109 to 31-December-2109	43,619	-102	9,043	5,246			43,994
01-January-2110 to 31-December-2110	43,042	257	8,895	5,134			43,303
01-January-2111 to 31-December-2111	40,516	614	8,442	4,788			41,179
01-January-2112 to 31-December-2112	44,801	1,226	8,960	5,229			43,560
01-January-2113 to 31-December-2113	51,652	1,263	10,051	6,047			48,688
01-January-2114 to 31-December-2114	72,976	1,718	13,471	8,551			64,814
01-January-2115 to 31-December-2115	66,908	4,354	12,115	7,507			58,468
01-January-2116 to 31-December-2116	62,055	3,507	11,569	7,026			55,975
01-January-2117 to 31-December-2117	62,037	2,607	11,781	7,132			57,024

01-January-2118 to 31-December-2118	61,019	2,999	11,576	6,962			56,074
01-January-2119 to 31-December-2119	68,903	3,260	12,720	7,877			61,391
01-January-2120 to 31-December-2120	66,633	3,567	12,292	7,568			59,372
01-January-2121 to 01-September-2121	65,211	3,685	11,999	7,383			38,641
Total	**7,820,220**	**-1,919,960**	**1,718,492**	**1,168,822**			**8,171,949**

6 MONITORING

6.1 Data and Parameters Available at Validation

Data / Parameter	$A_{BSL,i}$
Data unit	Ha
Description	Area of baseline polygon, i
Source of data	Land title records and HRIS geospatial files
Value applied	46,000
Justification of choice of data or description of measurement methods and procedures applied	Area of the Project Area according to land title records and geospatial files.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Value will not change over life of project

Data / Parameter	$\Delta C_{,t}$
Data unit	tC/yr
Description	The annual carbon balance in the baseline or project scenario for year, t
Source of data	Calculated in equation 1 (Section 8.1); equation 29 (Section 8.2). Labeled with subscript BSL and PRJ, respectively.
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	$\Delta C_{BSL,t}$ is calculated in Equation 1 $\Delta C_{PRJ,t}$ is calculated in Equation 29
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions

Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$\Delta C_{P,t}$
Data unit	tC/yr
Description	The annual change in carbon stocks in all pools in the baseline or project scenario across the project activity area for year, t
Source of data	Calculated in equation 2 (Section 8.1); equation 30 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	$\Delta C_{BSL,P,,t}$ is calculated in Equation 2 $\Delta C_{PRJ,P,t}$ is calculated in Equation 30
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$\Delta C_{LB,t}$
Data unit	tC/yr
Description	The annual change in carbon stocks in living tree biomass (above- and belowground) for year, t
Source of data	Calculated in equation 3 (Section 8.1); equation 31 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	$\Delta C_{BSL,LB,t}$ is a modelled output of CBM-CFS3 $\Delta C_{PRJ,LB,t}$ is a modelled output of CBM-CFS3
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$\Delta C_{DOM,t}$
Data unit	tC/yr
Description	The annual change in carbon stocks in dead organic matter for year, t
Source of data	Calculated in equation 10 (Section 8.1); equation 38 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	$\Delta C_{BSL,DOM,t}$ is calculated in Equation 10 $\Delta C_{PRJ,DOM,t}$ is calculated in Equation 38
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$\Delta C_{HWP,t}$
Data unit	tC/yr
Description	The annual change in carbon stocks in harvested wood products for year, t
Source of data	Calculated in equation 18 (Section 8.1); equation 46 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	$\Delta C_{BSL,HWP,t}$ is calculated in Equation 18 $\Delta C_{PRJ,HWP,t}$ is calculated in Equation 46
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$\Delta C_{G,t}$

Data unit	tC/yr
Description	The annual change in carbon stocks due to live biomass gain for year, t
Source of data	Calculated in equation 4 (Section 8.1); equation 32 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	Value modelled within CBM-CFS3
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$\Delta C_{L,t}$
Data unit	tC/yr
Description	The annual change in carbon stocks due to live biomass loss for year, t
Source of data	Calculated in equation 6 (Section 8.1); equation 34 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	Value modelled within CBM-CFS3
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$\Delta C_{LDW,t}$
Data unit	tC/yr
Description	The annual change in lying dead wood carbon stocks for year, t

Source of data	Calculated in equations 11a, 12, 13 (Section 8.1); equations 39a, 40, 41 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	$\Delta C_{BSL,LDW,t}$ is a modelled output of CBM-CFS3 $\Delta C_{PRJ,LDW,t}$ is a modelled output of CBM-CFS3
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$\Delta C_{SNAG,t}$
Data unit	tC/yr
Description	The annual change in standing dead wood carbon stocks for year, t
Source of data	Calculated in equations 14a, 15, 16 (Section 8.1); equations 42a, 43, 44 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	$\Delta C_{BSL,SNAG,t}$ is a modelled output of CBM-CFS3 $\Delta C_{PRJ,SNAG,t}$ is a modelled output of CBM-CFS3
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$\Delta C_{DBG,t}$
Data unit	tC/yr
Description	The annual change in dead belowground carbon stocks for year, t

Source of data	Calculated in equations 17a, 17c, 17d (Section 8.1); equations 45a, 45c, 45d (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	$\Delta C_{BSL,DBG,t}$ is a modelled output of CBM-CFS3 $\Delta C_{PRJ,DBG,t}$ is a modelled output of CBM-CFS3
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	CF
Data unit	tC/tdm
Description	Carbon fraction of dry matter
Source of data	IPCC default value = 0.5, if more relevant values are not available
Value applied	0.5, applied within CBM-CFS3.
Justification of choice of data or description of measurement methods and procedures applied	IPCC and VM0012 default value."CBM-CFS3 converts units of dry matter to mass of C using a conversion factor of 0.5 g C/g dry matter" (Kurz et al. 2009).
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	R_i
Data unit	unitless
Description	Root:shoot ratio in polygon, i
Source of data	Li et al 2003
Value applied	Contained within CBM-CFS3

Justification of choice of data or description of measurement methods and procedures applied	Value is contained within CBM-CFS3 based on most recent update of root:shoot ratios from Li et al. 2003
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Root allocation can vary by site productivity; relatively more biomass may be allocated to roots in poor than richer soils

Data / Parameter	**BEF**
Data unit	unitless
Description	Biomass expansion factors for conversion of productivity metrics to biomass
Source of data	The source of data must be chosen with priority from higher to lower preference as follows: (a) Existing local and forest type-specific; (b) National and forest type-specific or eco-region-specific (e.g. from national GHG inventory); (c) Forest type-specific or eco-region-specific from neighboring countries with similar conditions. Sometimes (c) might be preferable to (b); (d) Globally forest type or eco-region-specific (e.g. IPCC literature: Table 3A.1.10 of GPG-LULUCF)
Value applied	Parameter is contained within CBM-CFS3 with expansion factors predicting biomass of merchantable and sapling sized trees separately, subdivided into live and dead biomass and predicting wood, bark, branches, and foliage biomass separately. Parameter values per Boudewyn et al. 2007 (see Page 487-488, Kurz et al. 2009, see Appendices within Boudewyn et al. 2007).
Justification of choice of data or description of measurement methods and procedures applied	Province and Ecozone specific value applied in CBM-CFS3. In CBM-CFS3, BEF values represent ratios between total stand biomass (t) and merchantable stem volume (m3) based on average growing conditions. These are applied to merchantable volume to estimate aboveground or total stand-level tree biomass, including both merchantable and sapling sized trees, live and dead biomass, and wood, bark, branches and foliage (Kurz et a., 2009: Page 490)
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	

Data / Parameter	$f_{BRANCH,i,t}$
Data unit	unitless
Description	The annual proportion of aboveground tree biomass comprised of branches > 5 cm diameter in polygon, i
Source of data	The source of data must be chosen with priority from higher to lower preference as follows: (a) Research publications relevant to the Project Area; (b) National and species-specific or group of species-specific (e.g. from National GHG inventory); (c) Species-specific or group of species-specific from neighboring countries with similar conditions. Sometimes (b) may be preferable to (a); (d) Globally species-specific or group of species-specific (e.g. IPCC GPGLULUCF).
Value applied	Parameter is contained within CBM-CFS3 and calculated with the equation: $P_{branches}=(e^{b1+b2*vol+b3*vol})/(1+e^{a1+a2*vol+a3*vol+1}+e^{b1+b2*vol+b3*vol+1}+e^{c1+c2*vol+c3*vol})$ See below and Boudewyn et al. 2007, Table 5, for parameter definitions and values.
Justification of choice of data or description of measurement methods and procedures applied	Region and Ecozone specific value applied in CBM-CFS3. The proportion of branches in a tree is estimated by CBM-CFS3 using equations by Boudewyn et al., 2007, Parameter values for a1,, a2, a3, b1, b2, b3, c1, c2, c3 are listed in Table 5: jurisdiction: Ontario (ON) and ecozone: 6; (Page 108-110) species: 302: Balsam fir, 1303: White birch, 101: Balck spruce; Cedar: 700; Maple:1401; Sugar Maple:1401; Whit spruce: 105; 1301: Yellow birch
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, same value. Applied in VM0012 workbook

Data / Parameter	$f_{BUCKINGLOSS,i,t}$
Data unit	unitless
Description	Annual proportion of the log bole biomass left on site after assessing and/or merchandizing the log bole for quality, in polygon, i

Source of data	Preferably, data for this variable must be based on regional and local comparative studies and experiential information derived from the local forest industry. Otherwise, an average default value of 21% can be used, based on US national summary statistics (Smith, Miles, Vissage, & Pugh, 2004).
Value applied	15% (0.15) volume harvested is transferred to the DOM because of forest processing (i.e. bucking) and does not transfer to the Forest Products Pool in CBM-CFS3.
Justification of choice of data or description of measurement methods and procedures applied	Region specific default values for proportion of merchantable tree left on site due to tops and stumps (bucking loss) is incorporated into CBM-CFS3 based on disturbance type and ecozone. Carbon in stem wood is directed to the forest products pool at the time of harvest and following bucking of trees into products and deductions of branches, tops, and stumps (i.e. slash) go into DOM pools and DOM pools are created according to Table 3 and Table 4 rates and parameters of Kurz et al., (2009). Parameters are Region-specific (Boreal Shield East) default values that depend on disturbance events applied in the modelling. A certain percentage of volume harvested is transferred to the DOM because of forest processing (i.e. bucking).
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different. Applied in VM0012 workbook

Data / Parameter	$P_{BSL,SLF}$, $P_{BSL,MLF}$, $P_{BSL,LLF}$
Data unit	unitless
Description	The short-lived fraction (PSLF), medium-lived fraction (PMLF), and long-lived fraction (PLLF), respectively, for product type, k (softwood sawlog and pulpwood)
Source of data	Calculated as per equations 22a-c (baseline) and equations 50ac (project)
Value applied	Softwood (unweighted) $P_{BSL,SLF}$ = 0.456, $P_{BSL,MLF}$ = 0.448, $P_{BSL,LLF}$ = 0.096 (Sawlog) $P_{BSL,SLF}$ = 0.68, $P_{BSL,MLF}$ = 0.312, $P_{BSL,LLF}$ = 0.008 (Pulpwood)

	Hardwood (unweighted) $P_{BSL,SLF}$ = 0.527, $P_{BSL,MLF}$ = 0.441, $P_{BSL,LLF}$ = 0.032 (Sawlog) $P_{BSL,SLF}$ = 0459, $P_{BSL,MLF}$ = 0.414, $P_{BSL,LLF}$ = 0.127 (Pulpwood) **Baseline Weighted Values:** Softwood: $P_{BSL,SLF}$ = 0.525, $P_{BSL,MLF}$ = 0.406, $P_{BSL,LLF}$ = 0.069 (Sawlog + Pulpwood) Hardwood $P_{BSL,SLF}$ = 0.466, $P_{BSL,MLF}$ = 0.417, $P_{BSL,LLF}$ = 0.118 (Sawlog + Pulpwood) **Project Weighted Values:** Softwood: $P_{BSL,SLF}$ = 0.456 * p_{SWSL} , $P_{BSL,MLF}$ = 0.448 * p_{SWSL}, $P_{BSL,LLF}$ = 0.096 * p_{SWSL} (Sawlog) $P_{BSL,SLF}$ = 0.68 * p_{SWPW}, $P_{BSL,MLF}$ = 0.312 * p_{SWPW}, $P_{BSL,LLF}$ = 0.008 * p_{SWPW} (Pulpwood) Hardwood: $P_{BSL,SLF}$ = 0.527 * p_{HWSL}, $P_{BSL,MLF}$ = 0.441 * p_{HWSL}, $P_{BSL,LLF}$ = 0.032 * p_{HWSL} (Sawlog) $P_{BSL,SLF}$ = 0459 * p_{HWPW}, $P_{BSL,MLF}$ = 0.414 * p_{HWPW}, $P_{BSL,LLF}$ = 0.127 * p_{HWPW} (Pulpwood) Where, p_{SWSL} = proportion of actual project softwood sawlog harvest p_{SWPW} = proportion of actual project softwood pulp harvest p_{HWSL} = proportion of actual project hardwood sawlog harvest p_{HWPW} = proportion of actual project hardwood pulp harvest
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per equations 22a-c (baseline)
Purpose of data	• Calculation of baseline emissions

	• Calculation of project emissions
Comments	Applied in VM0012 workbook

Data / Parameter	**$P_{3\text{-year}}$ and $P_{100\text{-year}}$**
Data unit	unitless
Description	The proportion of total carbon stored in wood products after 3 years (P3-year); and the proportion of harvested wood stored for 100 years (P100-year), for product type, k (Hardwood sawlog and pulpwood)
Source of data	Calculated for the baseline and project scenario
Value applied	Softwood (unweighted): $P_{3\text{-year},}$ = 0544, $P_{100\text{-year}}$ =0.096 (sawlog) $P_{3\text{-year},}$ = 0.32, $P_{100\text{-year}}$ =0.008 (pulpwood) Hardwood (unweighted): $P_{3\text{-year},}$ = 0.473, $P_{100\text{-year}}$ =0.032 (sawlog) $P_{3\text{-year},}$ = 0.541, $P_{100\text{-year}}$ =0.127 (pulpwood) **Baseline Weighted Values:** Softwood: $P_{3\text{-year},}$ = 0.074, $P_{100\text{-year}}$ =0.011 (sawlog) Hardwood: $P_{3\text{-year},}$ = 0.451, $P_{100\text{-year}}$ =0.099 (pulpwood) **Project Weighted Values:** Softwood: $P_{3\text{-year},}$ = 0.473 × p_{SWSL}, $P_{100\text{-year}}$ =0.032 p_{SWSL} (sawlog) $P_{3\text{-year},}$ = 0.541× p_{SWPW}, $P_{100\text{-year}}$ =0.008 × p_{SWPW} (pulpwood) Hardwood: $P_{3\text{-year},}$ = 0.473 × p_{SWSL}, $P_{100\text{-year}}$ =0.032 × p_{SWSL} (sawlog) $P_{3\text{-year},}$ = 0.541 × p_{SWPW}, $P_{100\text{-year}}$ =0.008 × p_{SWPW} (pulpwood) Where, p_{SWSL} = proportion of actual project softwood sawlog harvest p_{SWPW} = proportion of actual project softwood pulp harvest p_{HWSL} = proportion of actual project hardwood sawlog harvest

	p_{HWPW} = proportion of actual project hardwood pulp harvest
Justification of choice of data or description of measurement methods and procedures applied	Values from Smith et al. (2006) based on North Central values, weighted to account for the average harvest volumes of the preceding landowner (m^3 going to sawlog and pulpwood for both softwood and hardwood types). Weighting: softwood sawlog = 69.23%, softwood pulpwood = 30.77%; hardwood sawlog = 9.72%, hardwood pulpwood = 90.28%.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Applied in VM0012 workbook

Data / Parameter	$f_{TRANSPORTk}$
Data unit	(unitless; 0 < fBSL,TRANSPORTk < 1).
Description	The fraction of raw material transported by transportation type, k.
Source of data	Estimated based on Heath et al. 2006 Supplementary referenced in VM0012 methodology Table 4.
Value applied	Transport Type Truck = 1 Transport Type Rail = 1 All raw material volume transported by both truck and rail. See excel, “PDMR_SECT6_Monitoring.xlsx”
Justification of choice of data or description of measurement methods and procedures applied	This project avoids emissions resulting from the transportation of harvested wood products. Default selection from Table 4 in VM0012 methodology applied
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variables used in both baseline (BSL) and project (PRJ) scenario, values will be different. Applied in VM0012 workbook.

Data / Parameter	$C_{HARVEST}$

Data unit	t C emitted/t C raw material
Description	The carbon emission intensity factor associated with harvesting
Source of data	See Table 4 (of VM0012 methodology)
Value applied	0.16 See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	This project avoids emissions associated with harvesting. Default selection from table 4 in VM0012 methodology applied
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variables used in both baseline (BSL) and project (PRJ) scenario, values will be different. Applied in VM0012 workbook.

Data / Parameter	$C_{MANUFACTURE_k}$
Data unit	t C emitted/t C raw material
Description	The carbon emission intensity factor associated with manufacture of product, k
Source of data	See Table 4 (of VM0012 methodology)
Value applied	Sawnwood = 0.040 Plywood & Structural Panels = 0.060 Non-structural Panels = 0.120 Paper (Mechanical Pulp): 0.48 Paper (Chemical Pulp): 0.13 See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	This project avoids emissions associated with the manufacturing of harvested wood products. Default selection from table 4 in VM0012 methodology applied for all values except paper. Value for paper is based on local sources and expert opinion from PFLP's Registered Professional Foresters (RPF).
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Applied in VM0012 workbook

Data / Parameter	$C_{TRANSPORTk}$
Data unit	t C emitted/t C raw material ● km
Description	The carbon emission intensity factor associated with the transport of raw material by transportation type of product, k
Source of data	See Table 4 (of VM0012 methodology)
Value applied	Transport via Truck = 0.00007 Tarnsport via Rail = 0.0000082 See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	This project avoids the emissions associated with the transportation of raw material. Default selection from table 4 in VM0012 methodology applied.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Applied in VM0012 workbook

Data / Parameter	$d_{TRANSPORTk}$
Data unit	km
Description	The distance transported by transportation type, k.
Source of data	Supplementary Expert opinion from PFLP's Registered Professional Foresters (RPF) based on local knowledge of log markets.
Value applied	Transport via Truck = 15 Transport via Rail = 570 See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	This project avoids the emissions associated with transportation of raw materials.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions

Comments	Applied in VM0012 workbook

Data / Parameter	$C_{EMITTRANSPORT,t}$
Data unit	tC/yr
Description	The annual fossil fuel emissions associated with the transport of raw material.
Source of data	Equation 26
Value applied	Annual calculation for baseline and project scenario. See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	This project avoids the emissions associated with transportation of raw materials. Default selection in VM0012 v1.2
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Applied in VM0012 workbook

Data / Parameter	$G_{AG,i,t}$
Data unit	tdm/ha/yr
Description	Annual increment rate in aboveground biomass (tdm/ha/yr), in polygon, i,
Source of data	Modeled within CBM-CFS3 (See Section 8.1 & Section 8.2 of VM0012)
Value applied	Modeled within CBM-CFS3 annually for baseline and project scenario
Justification of choice of data or description of measurement methods and procedures applied	Value modelled within CBM-CFS3
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions

Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$G_{BG,i,t}$
Data unit	tdm/ha/yr
Description	Annual increment rate in belowground biomass (tdm/ha/yr), in polygon, i,
Source of data	Calculated from G_{AG} and R_i
Value applied	Modeled within CBM-CFS3 annually for baseline and project scenario
Justification of choice of data or description of measurement methods and procedures applied	Value modelled within CBM-CFS3
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$LBL_{NATURAL,i,t}$
Data unit	tdm/yr
Description	Annual loss of live tree biomass due to natural mortality in polygon, i; tdm/yr
Source of data	Modeled (See Section 8.1 & Section 8.2)
Value applied	Modeled within CBM-CFS3 annually for baseline and project scenario. See Kurz et al. 2009, Table 3, Page 491 for parameters values.
Justification of choice of data or description of measurement methods and procedures applied	Value modelled within CBM-CFS3. CBM-CFS3 parameter default value for Boreal Shield East ecological zone.
Purpose of data	• Calculation of baseline emissions

	• Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$LBL_{FELLINGS,i,t}$
Data unit	tdm/yr
Description	Annual loss of live tree biomass due to commercial felling in polygon, i; tdm/yr
Source of data	Modeled (See Section 8.1 & Section 8.2)
Value applied	Modeled within CBM-CFS3 annually for baseline and project scenario. **Conifer, Intolerant Hardwood, and Mixedwood without Tolerant Hardwood Leading:** LBLFELLINGSi,t = 0.85 **Tolerant Hardwood, Mixedwood Tolerant Hardwood Leading:** First stand entry: LBLFELLINGSi,t = 0.50 Second stand entry, year 20: LBLFELLINGSi,t=1.00
Justification of choice of data or description of measurement methods and procedures applied	"LBLBSL,FELLINGS,i,t" is the proportion of biomass removed by harvesting from the stands. Harvest schedules used "Clearcut harvest without salvage" with 85% volume removal for conifer, intolerant hardwood, and all non-tolerant hardwood leading mixedwood stands. "Partial Cutting" was applied for tolerant hardwood and tolerant hardwood leading mixedwood stands. Partial cutting involved 50% volume removal in the initial stand entry and 20-years later a clearcut without salvage removing remaining merchantable volume to represent the final overstory removal of the shelterwood harvest regime.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$LBL_{OTHER,i,t}$

Data unit	tdm/yr
Description	Annual loss of live tree biomass from incidental sources in polygon, i; tdm/yr
Source of data	Modeled (See Section 8.1 & Section 8.2)
Value applied	Modeled within CBM-CFS3 annually for baseline and project scenario. See Kurz et al. 2009, Table 3, Page 491 for parameters values.
Justification of choice of data or description of measurement methods and procedures applied	Value modelled within CBM-CFS3. CBM-CFS3 parameter default value for Boreal Shield East ecological zone.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different
Data / Parameter	$LB_{i,t}$
Data unit	tdm/yr
Description	Average live tree biomass in polygon, i, for year, t
Source of data	Calculated from $G_{i,t}$
Value applied	Modeled within CBM-CFS3 annually for baseline and project scenario
Justification of choice of data or description of measurement methods and procedures applied	Value modelled within CBM-CFS3.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$f_{BSL,NATURAL,i,t}$
Data unit	unitless; $0 < f_{NATURAL,i,t} < 1$

Description	The annual proportion of biomass that dies from natural mortality in forest type analysis unit or polygon, i, year, t.
Source of data	Literature reports, and/or inventory data.
Value applied	Modeled within CBM-CFS3 annually for baseline and project scenario. See Kurz et al. 2009, Table 3, Page 491
Justification of choice of data or description of measurement methods and procedures applied	FBSL,NATURAL,i,t is the biomass turnover in the model and it uses biomass turnover rates to represent natural mortality of biomass (Table 3: Kurz et al., 2009). Ecosystem processes represented by these parameters include tree stem, foliage, branch, and root mortality. The model estimates biomass turnover using annual biomass turnover rates (% mortality per year) for most stand growth up until the point of natural stand break-up where yield curves decline depending on the ecozone. After this point, turnover from each biomass C pool is added to losses caused by stand break-up and natural mortality. After the CBM-CFS3 estimates biomass turnover, it uses litterfall transfer rates to assign the carbon to different DOM pools as specified in the model's structure (Kurz et al., 2009 Page 489).
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	$f_{BSL,HARVEST,i,t}$
Data unit	unitless; $0 < f_{BSL,HARVEST,i,t} < 1$
Description	The proportion of biomass removed by harvesting from polygon, i, in year, t.
Source of data	Baseline: previous landowner's forward-looking forest management plan. Project: Inventory data, harvest records.
Value applied	**Conifer, Intolerant Hardwood, and Mixedwood (non-Tolerant Hardwood Leading):** LBLFELLINGSi,t = 0.85 of harvest treated polygon biomass removal due to clearcut **Tolerant Hardwood, Mixedwood Tolerant Hardwood Leading:** First stand entry: LBLFELLINGSi,t = 0.50 of harvest treated polygon biomass removal due to partial cut.

	Second stand entry, year 20: LBLFELLINGSi,t=1.00 of harvest treated polygon biomass removal due to clearcut
Justification of choice of data or description of measurement methods and procedures applied	Annualized harvest schedule and common practice justification provided in 3.4 – Baseline Scenario
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	$f_{BSL,DAMAGE,i,t}$
Data unit	unitless; $0 < f_{BSL,DAMAGE,i,t} < 1$
Description	The proportion of additional biomass removed for road and landing construction in polygon, i, year, t
Source of data	Literature reports, and/or inventory data.
Value applied	0%
Justification of choice of data or description of measurement methods and procedures applied	0% additional biomass removal due to road and landing construction. Road and landing construction is conservatively assumed to contribute to harvest target. For clearcut stands, 2% of clearcut treated polygon area is transitioned to 0% growth rate growth & yield curve in CBM-CFS3, but only on first stand entry. No transition due to loss of productivity is assumed for stands treated with shelterwood harvest.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	No additional biomass removal accounted for due to landing and road construction. Road and landing construction was accounted for as follows: For clearcut: 2% of stand transitions to a 0% growth rate yield curve with no additional transitions on subsequent stand entries. Shelterwood: no productivity losses associated with road and landing construction.

Data / Parameter	$f_{BSL,BLOWDOWN,i,t}$
Data unit	unitless; $0 < f_{BSL,BLOWDOWN,i,t} < 1$
Description	The annual proportion of live aboveground tree biomass subject to blowdown in polygon, i, year, t.
Source of data	Literature reports, and/or inventory data.
Value applied	$f_{BSL,BLOWDOWN,i,t} = 0$
Justification of choice of data or description of measurement methods and procedures applied	Set as 0 in the project and baseline scenario, as no unique parameter value exists for blowdown (windthrow) as it is modelled by CBM-CFS3 in aggregate with all endemic agents of stand mortality/thinning. Blowdown is included within the natural mortality factors calculated in fBSL,NATURAL,i,t, fPRJ,NATURAL,i,t by CBM-CFS3. CBM-CFS3 uses ecozone and growth & yield specific values to derive transfer rates which are inclusive of all endemic agents of transfer from live to dead pools (see Table 3 and Table 4 of Kurz et al. 2009). See Kurz et al. 2009, section "3.3 Biomass turnover and litterfall transfers".
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	

Data / Parameter	$f_{BSL,SNAGFALLDOWN,i,t}$
Data unit	unitless; $0 < f_{BSL,SNAGFALLDOWN,i,t} < 1$
Description	The annual proportion of snag biomass in polygon, i, year, t, that falls over and thus is transferred to the LDW pool.
Source of data	Modelled within CBM-CFS3
Value applied	Softwood Stem: 0.032 Softwood Branch: 0.1 Hardwood Stem: 0.032 Hardwood Branch: 0.1 See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	Fall down due to snags (fBSL,SNAGFALLDOWN,i,t) is incorporated into the CBM-CFS3 model utilizing default values designated by ecozone (Boreal Shield East in this case). This value is defined within the parameter "Non- Forest Initial Conditions" under the pool's softwood and hardwood stem and branch snag (four

	separate parameters). Default values can be found within Appendix 3 of the user guide. Default values for Boreal Shield East are used.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	$f_{BSL,lwDECAY,i,t}$
Data unit	unitless; $0 < f_{BSL,lwDECAY,i,t} < 1$
Description	The annual proportional loss of lying dead biomass due to decay, in polygon i, year, t.
Source of data	Modelled within CBM-CFS3
Value applied	0.0374 Calculated by CBM-CFS3: see section 3.4 – Decay Dynamics, which explains calculation along with Table 4, "Medium" CBM-CFS3 pool parameter values. Medium pool represents course woody debris on the ground.
Justification of choice of data or description of measurement methods and procedures applied	Value is contained within CBM-CFS3. Dead organic matter dynamics are calculated by CBM-CFS3 based on the project area stratifications, regionally specific forest dynamics and the related carbon curves. Default parameters and algorithms within the model track each stand's dead wood dynamics, including standing dead, downed dead, and below ground dead organic matter. CBM-CFS3 uses the regionally specific variant data and related parameters to model and track dead organic matter between carbon pools (Aboveground Dead, [i.e. Stem Snags], Belowground Dead, Aboveground Slow DOM (VM0012 calls this Lying Dead Wood). (Page 491 of Kurz et al., 2009: Table 4)
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	$f_{BSL,SWDECAY,i,t}$
Data unit	unitless; $0 < f_{BSL,SWDECAY,i,t} < 1$

Description	The annual proportional loss of snag biomass due to decay, in polygon, i, year, t.
Source of data	Modelled within CBM-CFS3
Value applied	Snag Stems = 0.0187 Snag Branches = 0.0718 See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	Value is contained within CBM-CFS3 and follows methods outlined by Kurz et al. 2009 - see section 3.4 – Decay Dynamics and Table 4, parameter values for "Snag stems" and "Snag branches" (Page 491).
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	$SNAG_{BSL,i,t}$
Data unit	tdm/yr
Description	The total amount of snag mass in polygon i, year, t
Source of data	Modelled within CBM-CFS3 based on equations 14b, 15,16
Value applied	*Calculated as:* $P_{dead} = prop \times b\_m$ *with parameter default values from Table 3a of Boudewyn et al. 2007 (Page 37-40).* P_{dead} = dead tree biomass/ha (tonnes) prop = prop1 - prop5 = proportion corresponding to first centile (volume<v1); second centile (v1<=volume<v2); etc. v1, v2, v3, v4 = centile boundaries (volume in m3/ha) *b_m* = expected stem wood biomass of merchantable-sized trees Default values based on: jur = jurisdiction = ON ecozone = Boreal Shield East = "6"
Justification of choice of data or description of measurement methods and procedures applied	Carbon pool is modelled within CBM-CFS3 per Table 3a of Boudewyn et al., 2007 (Page 37-40; jur: ON and ecozone:6). Proportion of dead tree biomass in CBM-CFS3 is calculated by

	combinations of jurisdiction-ecozone-predominant genus-volume centile.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	$DBG_{i,t}$
Data unit	tdm/yr
Description	The total quantity of dead belowground biomass accumulated in polygon i since the project start; t biomass.
Source of data	Modelled within CBM-CFS3 based on equations 17b, 17c,17d (Section 8.1); and equations 45b, 45c,45d (Section 8.2)
Value applied	See Table 4 of Kurz et al. 2009, including "BG fast" and BG very fast" CBM-CFS3 pools.
Justification of choice of data or description of measurement methods and procedures applied	Carbon pool is modelled within CBM-CFS3 per parameters in Table 4 of Kurz et al. 2009. Accumulation involves only root biomass ("Belowground fast DOM" and "Belowground very fast DOM") and excludes humified organic matter in mineral soil (i.e., excludes soil organic carbon). Belowground fast DOM = "dead coarse roots in the mineral soil, approximately ≥5cm diameter"; belowground very fast DOM = "dead fine roots in the mineral soil approximately <5mm diameter".
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$\Delta C_{STORHWP1,t}$
Data unit	tC/yr
Description	Annual harvested carbon that remains in permanent storage after conversion to wood products during primary processing
Source of data	Calculated in equation 19 (Section 8.1) and equation 47 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"

Justification of choice of data or description of measurement methods and procedures applied	$\Delta C_{BSL,STORHWP1,t}$ is calculated in Equation 19 $\Delta C_{PRJ,STORHWP1,t}$ is calculated in Equation 47
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$C_{MILL,h,k}$
Data unit	tC
Description	The carbon contained in harvested timber after milling in period h, for product type k
Source of data	Calculated as per methodology deviation and equation 49 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	$\Delta C_{BSL,MILL,h,k}$ is calculated as per Methodology Deviation $\Delta C_{PRJ,MILL,h,k}$ is calculated in Equation 49
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$C_{TIMBER,h}$
Data unit	tC
Description	The carbon contained in timber harvested in period h
Source of data	Calculated in equation 20 (Section 8.1) and equation 48 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of	$C_{BSL,TIMBER,h}$ is a modelled output of CBM-CFS3 $C_{PRJ,TIMBER,h}$ is a modelled output of CBM-CFS3

measurement methods and procedures applied	
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$C_{STORHWP,h,t}$
Data unit	tC
Description	The carbon stored in harvested wood products in year t summed for all product types k and then over all harvest periods h; t C
Source of data	Calculated in equation 23 (Section 8.1) and equation 51 (Section 8.2)
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	$\Delta C_{BSL,STORHWP,h,t}$ is calculated in Equation 23 $\Delta C_{PRJ,STORHWP,h,t}$ is calculated in Equation 51
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different

Data / Parameter	$f_{RND,k}$
Data unit	dimensionless
Description	The fraction of growing stock volume removed as roundwood for product type k
Source of data	VM0012 methodology (default values by region in Table 1.5 of the 1605(b) document)
Value applied	n/a
Justification of choice of data or description of	Data/Parameter not relevant for calculations as project deviates from methodology and does not apply equation 21 (see Section 3.6 Methodology Deviations)

measurement methods and procedures applied	
Purpose of data	Calculation of storage in harvested wood products
Comments	Variable ordinarily used in both baseline (BSL) and project (PRJ) scenarios. However, refer to section 3.6 Methodology Deviations.

Data / Parameter	$r_{RND,k}$
Data unit	dimensionless
Description	The ratio of industrial roundwood to growing stock volume removed as roundwood for product type k.
Source of data	VM0012 methodology (default values by region in Table 1.5 of the 1605(b) document)
Value applied	n/a
Justification of choice of data or description of measurement methods and procedures applied	Data/Parameter not relevant for calculations as project deviates from methodology and does not apply equation 21 (see Section 3.6 Methodology Deviations)
Purpose of data	Calculation of storage in harvested wood products
Comments	Variable ordinarily used in both baseline (BSL) and project (PRJ) scenarios. However, refer to section 3.6 Methodology Deviations.

Data / Parameter	$\Delta C_{EMITFOSSIL,t}$
Data unit	tC/yr
Description	Fossil fuel emissions from harvesting (logging and log transport) and processing of the various wood products.
Source of data	Calculated in equation 24 (Section 8.1) and equation 52 (Section 8.2)
Value applied	Calculated annually for baseline and project scenario See excel, “PDMR_SECT6_Monitoring.xlsx”
Justification of choice of data or description of measurement methods and procedures applied	This project avoids the emissions associated with harvest activities and transportation and processing. The approach applied is the Default selection in VM0012 v1.2.

Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different. Applied in VM0012 workbook

Data / Parameter	$C_{EMITHARVEST,t}$
Data unit	tC/yr
Description	Annual fossil fuel emissions associated with harvesting of raw material.
Source of data	Calculated in equation 25 (Section 8.1) and equation 53 (Section 8.2)
Value applied	Calculated annually for baseline and project scenario See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	This project avoids the emissions associated with harvest activities and transportation and processing. The approach applied is the Default selection in VM0012 v1.2.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different. Applied in VM0012 workbook

Data / Parameter	$C_{EMITMANUFACTURE,t}$
Data unit	tC/yr
Description	Annual fossil fuel emissions associated with the manufacturing of raw material.
Source of data	Calculated in equation 27 (Section 8.1) and equation 55 (Section 8.2)
Value applied	Calculated annually for baseline and project scenario See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of	This project avoids the emissions associated with harvest activities and transportation and processing. The approach applied is the Default selection in VM0012 v1.2.

measurement methods and procedures applied	
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different. Applied in VM0012 workbook.

Data / Parameter	$C_{EMITTRANSPORT,t}$
Data unit	tC/yr
Description	Annual fossil fuel emissions associated with the transport of raw material.
Source of data	Must be calculated after consideration of the transport distance from harvest to processing facility, and the means of transportation (after Heath et al. 2006 Supplementary). An example of calculation steps is provided in Section 8.1.
Value applied	Calculated annually for baseline and project scenario See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	This project avoids the emissions associated with harvest activities and transportation and processing. The approach applied is the Default selection in VM0012 v1.2.
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Variable used in both baseline (BSL) and project (PRJ) scenario, values may be different. Applied in VM0012 workbook

Data / Parameter	LE_y
Data unit	tCO_2e/yr
Description	the project market leakage in year, y
Source of data	Equation 56d in Section 8.3.5 Option 3
Value applied	Calculated annually See excel, "PDMR_SECT6_Monitoring.xlsx"

Justification of choice of data or description of measurement methods and procedures applied	VM0012 methodology allows proponents to apply Option 3 from methodology and undertake an assessment of market leakage conditions more detailed and specific to their project location and condition. Methods and procedures applied as described in VM0012 methodology.
Purpose of data	• Calculation of leakage
Comments	Applied in VM0012 workbook

Data / Parameter	SE_y
Data unit	tCO_2e/yr
Description	The project market leakage in year, y
Source of data	Calculated in Section 8.3.2, Option 2 – not applied in this project
Value applied	0
Justification of choice of data or description of measurement methods and procedures applied	Section 8.3.5 Market Leakage Option 3 used
Purpose of data	• Calculation of leakage
Comments	-

Data / Parameter	MLF_y
Data unit	unitless
Description	The project market leakage
Source of data	Calculated in Section 8.3.5
Value applied	15.30% See excel, “PDMR_SECT6_Monitoring.xlsx”
Justification of choice of data or description of measurement methods and procedures applied	Section 8.3.5 Market Leakage Option 3 used

Purpose of data	• Calculation of leakage
Comments	-

Data / Parameter	$BC_{hv,n}$
Data unit	tCO_2e/yr
Description	The estimated average baseline amount of onsite carbon harvested in reporting period, n (prior to delivery to a mill).
Source of data	Calculated in Section 8.3.2 f VM0012.
Value applied	n/a
Justification of choice of data or description of measurement methods and procedures applied	Section 8.3.5: applicable only for Market leakage Option 1 and 2. It is not applicable to Option 3, which we have chosen. Therefore we do not report a value for this parameter.
Purpose of data	• Calculation of leakage
Comments	-

Data / Parameter	$AC_{hv,n}$
Data unit	tCO_2e/yr
Description	The actual onsite carbon harvested in reporting period, n (prior to delivery to a mill).
Source of data	Calculated in Section 8.3.2 of VM0012. See Appendix A.
Value applied	n/a
Justification of choice of data or description of measurement methods and procedures applied	Section 8.3.5: applicable only for Market leakage Option 1 and 2. It is not applicable to Option 3, which we have chosen. So we do not report a value for this parameter.
Purpose of data	• Calculation of leakage
Comments	-

Data / Parameter	$ER_{y,GROSS}$

Data unit	tCO_2e/yr
Description	The gross difference in the overall annual carbon change between the baseline and project scenarios in year, y
Source of data	Calculated annually
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	Calculated in Equation 57
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	ER_y
Data unit	tCO_2e/yr
Description	The net GHG emissions reductions and/or removals in year y (the overall annual carbon change between the baseline and project scenarios, net all discount factors except the permanence buffer)
Source of data	Calculated annually
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	Calculated in equation 58
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	VCU_y
Data unit	tCO_2e/yr

Description	Amount of Verified Carbon Units the project estimates are available for issuance and sale in year 'y'
Source of data	Calculated annually
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	Calculated in Equation 59
Purpose of data	Calculation of VCUs
Comments	-

Data / Parameter	E_M
Data unit	%
Description	Mean model error based on the relative area-weighted difference between of model-predicted values of carbon storage and those values measured in field plots
Source of data	Model output and field data
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	Calculated in Equation 60a. Calculation of uncertainty factor
Purpose of data	Determination of VCUs
Comments	-

Data / Parameter	E_I
Data unit	%
Description	Inventory sampling error calculated as the 90% confidence limit of the area-weighted differences between the model-predicted values of carbon storage and those values measured in field plots
Source of data	Model output and field data

Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	Calculated in Equation 60c and uncertainty factor
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	E_P
Data unit	%
Description	Total project error-based sum of the CBM-CFS3 and inventory error terms
Source of data	CBM-CFS3 output and field data
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	Calculated in Equation 60f and uncertainty factor
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	$ER_{y,ERR}$
Data unit	Unitless
Description	The uncertainty factor calculated for year 'y' in Section 8.5.3
Source of data	Calculated in Section 8.5.3
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of	Calculated in Section 8.5.3

measurement methods and procedures applied	
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	BR_y
Data unit	tCO_2e/yr
Description	Estimated VCU-equivalent tCO_2e issued to the VCS Buffer Pool in year, y
Source of data	Calculated using the latest version of the VCS AFOLU Non-Permanence Risk Tool
Value applied	See excel, "PDMR_SECT6_Monitoring.xlsx"
Justification of choice of data or description of measurement methods and procedures applied	Calculated using the latest version of the VCS AFOLU Non-Permanence Risk Tool
Purpose of data	Calculation of VCUs
Comments	-

6.2 Data and Parameters Monitored

Data / Parameter	$A_{PRJ,i}$
Data unit	Ha
Description	Area of forest land in polygon, i
Source of data	Monitoring of polygons and stand boundaries must be done preferably using a Geographic Information System (GIS), which allows for integrating data from different sources (including GPS coordinates and Remote Sensing data).
Description of measurement methods	This parameter will get reviewed at every verification via GIS analysis to ensure boundary does not change.

and procedures to be applied	
Frequency of monitoring/recording	Per monitoring period
Value applied	46,000
Monitoring equipment	Visual, satellite imagery, GIS software
QA/QC procedures to be applied	n/a
Purpose of data	Equations #32-60 • Determination of baseline scenario • Calculation of baseline emissions • Calculation of project emissions
Calculation method	Using GIS software
Comments	Value will be reviewed every monitoring period and is not expected to change over life of project

Data / Parameter	$A_{p,l,t}$
Data unit	m^2
Description	Area of sample plot in polygon, i, at time, t
Source of data	Recording and archiving of size of sample plots
Description of measurement methods and procedures to be applied	Plots will be of a nested design and have a small radius plot of 3.99 meters and a large radius plot of 11.28 meters – determined at validation - from the plot center. Plot center is identified by GPS coordinates and branch flagging tape, and the plot number and date is clearly written on a metal tag and permanently fixed to the nearest tree, due North, at a height of 1 meter. See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N of PD).
Frequency of monitoring/recording	As per methodology, permanent sample plots must be re-measured at intervals of ≤ 5 years.
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring equipment	Hand-held GPS device, measuring tape.

QA/QC procedures to be applied	See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N) and Perimeter Forest LP's Algoma Property Permanent Carbon Plots Field Measurements: Quality Control_ Report NorthWinds (Appendix O).
Purpose of data	Calculation of mean aboveground biomass BAG and DOMSNAG in Section 9.3.2 and 8.2.3. • Calculation of baseline emissions • Calculation of project emissions
Calculation method	See Appendix N
Comments	-

Data / Parameter	$DBH_{,t}$
Data unit	Cm
Description	Diameter at breast height measured for each tree in the sample plots at time, t
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	Typically measured at 1.3m height above ground. Measure all trees above minimum DBH (5 cm) in the sample plots that result from the IFM project activity. See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N).
Frequency of monitoring/recording	As per methodology, permanent sample plots must be re-measured at intervals of ≤ 5 years.
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring equipment	Measuring tape, calipers.
QA/QC procedures to be applied	See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N) and Perimeter Forest LP's Algoma Property Permanent Carbon Plots Field Measurements: Quality Control Report NorthWinds (Appendix O).
Purpose of data	Calculation of mean aboveground biomass BAG in Section 9.3.2 and 8.2.3. • Calculation of baseline emissions • Calculation of project emissions

Calculation method	Measured value. Not Calculated. See Appendix N
Comments	-

Data / Parameter	$Height_{,t}$
Data unit	M
Description	Tree height measured for each tree in the sample plots at time, t
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	Total height is defined as the vertical distance between the base of the tree on the uphill side and the tip of the crown. See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N) for detailed guidance.
Frequency of monitoring/recording	As per methodology, permanent sample plots must be re-measured at intervals of ≤ 5 years.
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring equipment	Measuring tape, clinometer, vertex.
QA/QC procedures to be applied	See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N) and Perimeter Forest LP's Algoma Property Permanent Carbon Plots Field Measurements: Quality Control_Report NorthWinds (Appendix O).
Purpose of data	Calculation of mean aboveground biomass BAG in Section 9.3.2 and 8.2.3. • Calculation of baseline emissions • Calculation of project emissions
Calculation method	See Appendix N
Comments	-

Data / Parameter	$L_{,t}$
Data unit	m
Description	Length of the transects to used determine volume of lying dead wood in the sample plots at time, t (default 100m)

Source of data	Field measurements
Description of measurement methods and procedures to be applied	See Appendix N
Frequency of monitoring/recording	As per methodology, permanent sample plots must be re-measured at intervals of ≤ 5 years.
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring Equipment	Measuring tape
QA/QC procedures to be applied	See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N) and Perimeter Forest LP's Algoma Property Permanent Carbon Plots Field Measurements: Quality Control_Report NorthWinds (Appendix O).
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	N/A
Comments	-

Data / Parameter	$d_{n,t}$
Data unit	cm
Description	Diameter of each piece n of dead wood along the transects in the sample plots at time, t
Source of data	Field measurements
Description of measurement methods and procedures to be applied	Measured using the line-intersect method (Section 9 of VM0012)[38]. See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N).
Frequency of monitoring/recording	As per methodology, permanent sample plots must be re-measured at intervals of ≤ 5 years.

[38] As permitted in VM0012 (stated on page 75 of VM0012), this project applies an alternative method for decay classes. The project applies 5 decay classes instead of 3 decay classes. This increases precision because additional classes allows to better differentiate between similar data values, reducing the chance of misclassifying them into broader, less precise categories. The additional classes represent distinct categories. The method applied follows Harmon et al., 2011 (an updated version from Harmon's et al., 2008).

Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring Equipment	Measuring tape, calipers.
QA/QC procedures to be applied	See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N) and Perimeter Forest LP's Algoma Property Permanent Carbon Plots Field Measurements: Quality Contro Report NorthWinds(Appendix O).
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Calculation of mean mass of DOMLDW in Section 9.3.2 and 8.2.3 of VM0012
Comments	-

Data / Parameter	$D_{LDW,c,i,t}$
Data unit	tdm/m^3
Description	Density of dead wood in density class, c along the transect in polygon, i, at time, t
Source of data	Field measurements
Description of measurement methods and procedures to be applied	Measured using the line-intersect method (Section 9 of VM0012)[39]. See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N).
Frequency of monitoring/recording	As per methodology, permanent sample plots must be re-measured at intervals of ≤ 5 years.
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring Equipment	N/A
QA/QC procedures to be applied	See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N) and Perimeter Forest LP's

[39] As permitted in VM0012 (stated on page 75 of VM0012), this project applies an alternative method for decay classes. The project applies 5 decay classes instead of 3 decay classes. This increases precision because additional classes allows to better differentiate between similar data values, reducing the chance of misclassifying them into broader, less precise categories. The additional classes represent distinct categories. The method applied follows Harmon et al., 2011 (an updated version from Harmon's et al., 2008).

	Algoma Property Permanent Carbon Plots Field Measurements: Quality Control Report NorthWinds (Appendix O).
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Calculation of mean mass of DOMLDW in Section 9.3.2 and 8.2.3 of VM0012
Comments	-

Data / Parameter	$N_{,t}$
Data unit	unitless
Description	Total number of wood pieces intersecting transects in the sample plots at time, t
Source of data	Field measurements
Description of measurement methods and procedures to be applied	Measured using the line-intersect method (Section 9 of VM0012)[40]. See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N).
Frequency of monitoring/recording	As per methodology, permanent sample plots must be re-measured at intervals of ≤ 5 years.
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring Equipment	N/A
QA/QC procedures to be applied	See Standard Operating Procedure Permanent Sample Plot Field Measurements (Appendix N) and Perimeter Forest LP's Algoma Property Permanent Carbon Plots Field Measurements: Quality Control Report NorthWinds (Appendix O).
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions

[40] As permitted in VM0012 (stated on page 75 of VM0012), this project applies an alternative method for decay classes. The project applies 5 decay classes instead of 3 decay classes. This increases precision because additional classes allows to better differentiate between similar data values, reducing the chance of misclassifying them into broader, less precise categories. The additional classes represent distinct categories. The method applied follows Harmon et al., 2011 (an updated version from Harmon's et al., 2008).

Calculation Method	Calculation of mean mass of DOMLDW in Section 9.3.2 and 8.2.3 of VM0012
Comments	-

Data / Parameter	$B_{AG,i,t}$
Data unit	tdm/ha
Description	Average total aboveground biomass in polygon, i, for year, t
Source of data	Calculated from $Height_{i,t}$, $DBH_{i,t}$, and $A_{p,i,t}$
Description of measurement methods and procedures to be applied	n/a
Frequency of monitoring/recording	Intervals of ≤ 5 years
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring Equipment	N/A
QA/QC procedures to be applied	See QA/QC procedure for summarizing plot data (Appendix O)
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Calculation of carbon stocks in above- and belowground living tree biomass in equations 28b & 28c, Section 8.2.3 of VM0012
Comments	-

Data / Parameter	$B_{BG,i,t}$
Data unit	tdm/ha

Description	Average total belowground biomass in polygon, i, for year, t
Source of data	Estimated from $B_{AG,i,t}$
Description of measurement methods and procedures to be applied	CBM-CFS3
Frequency of monitoring/recording	Intervals of ≤ 5 years
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring Equipment	N/A
QA/QC procedures to be applied	See QA/QC procedure for carbon stock calculation (Appendix P)
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Calculation of carbon stocks in above- and belowground living tree biomass in equations 28b & 28c, Section 8.2.3 of VM0012.
Comments	-

Data / Parameter	$B_{TOTAL,i,t}$
Data unit	tdm/ha
Description	Average total live biomass in polygon, i, for year, t
Source of data	Calculated from $B_{AGi,t}$ and $B_{BGi,t}$
Description of measurement methods and procedures to be applied	Estimated from CBM-CFS3
Frequency of monitoring/recording	Intervals of ≤ 5 years

Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring Equipment	N/A
QA/QC procedures to be applied	See QA/QC procedure for carbon stock calculation (Appendix P)
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Calculation of carbon stocks in above- and belowground living tree biomass in equations 28c, Section 8.2.3 of VM0012.
Comments	-

Data / Parameter	$DOM_{LDW,i,t}$
Data unit	tdm/ha
Description	Average mass of dead organic matter contained in lying dead wood in polygon, i, year, t
Source of data	Calculated from $L_{i,t}$, $d_{n,i,t}$, $D_{LDW,c,i,t}$, and $N_{i,t}$
Description of measurement methods and procedures to be applied	Estimated from CBM-CFS3
Frequency of monitoring/recording	Intervals of ≤ 5 years
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring Equipment	N/A
QA/QC procedures to be applied	See QA/QC procedure for carbon stock calculation (Appendix P)
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions

Calculation Method	Calculation of carbon stocks in above- and belowground living tree biomass in equation 28e, Section 8.2.3 of VM0012.
Comments	-

Data / Parameter	$DOM_{SNAG,i,t}$
Data unit	tdm/ha
Description	Average mass of dead organic matter contained in standing dead wood in polygon, i, year, t
Source of data	Calculated from $Height_{i,t}$, $DBH_{i,t}$, and $A_{p,i,t}$ of dead trees measured in sample plots described in Section 9
Description of measurement methods and procedures to be applied	Estimated from CBM-CFS3
Frequency of monitoring/recording	Intervals of ≤ 5 years
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Monitoring Equipment	N/A
QA/QC procedures to be applied	See QA/QC procedure for carbon stock calculation (Appendix P)
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Calculation of carbon stocks in above- and belowground living tree biomass in equation 28e, Section 8.2.3 of VM0012
Comments	-

Data / Parameter	$f_{PRJ,NATURAL,i,t}$
Data unit	unitless; $0 < f_{PRJ,NATURAL,i,t} < 1$

Description	The annual proportion of biomass that dies from natural mortality in polygon, i, year, t.
Source of data	Permanent sample plots:, and forest inventory updates.
Description of measurement methods and procedures to be applied	Height and dbh of dead trees in permanent sample plots will be recorded and compiled. Field GPS measured or remote sensing to update forest inventory for any disturbances that cause mortality.
Frequency of monitoring/recording	Intervals of ≤ 5 years for permanent sample plots. Annually for inventory updates for disturbances causing mortality.
Value applied	Parameters in CBM-CFS3 estimates biomass turnover using annual biomass turnover rates (% mortality per year)
Monitoring Equipment	Field measurement equipment and remote sensing/GIS analysis
QA/QC procedures to be applied	See QA/QC procedure for carbon stock calculation (Appendix P) Latest plot field data standard operating procedures (SOP)
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Equation 35, Section 8.2 of VM0012
Comments	-

Data / Parameter	$f_{PRJ,HARVEST,i,t}$
Data unit	unitless; $0 < f_{PRJ,HARVEST,i,t} < 1$
Description	The proportion of biomass removed by harvesting from polygon, i, in year, t
Source of data	Harvesting records for the harvest area.
Description of measurement methods and procedures to be applied	Harvest boundaries are mapped using field GPS and then overlaid with inventory data to determine how much biomass is removed from polygon i. Inventory polygons will be adjusted to match harvest boundaries. Delivered harvest volumes may be substituted.

Frequency of monitoring/recording	Annually
Value applied	See most recent inventory for applicable monitoring period
Monitoring Equipment	GPS
QA/QC procedures to be applied	See QA/QC procedure for carbon stock calculation (Appendix P of PD) Ground truthing and comparison to remote sensing information.
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Equation 36, Section 8.2 of VM0012.
Comments	-

Data / Parameter	$f_{PRJ,DAMAGE,i,t}$
Data unit	unitless; $0 < f_{PRJ,DAMAGE,i,t} < 1$
Description	The proportion of additional biomass removed for road and landing construction in polygon, i, year, t
Source of data	Field GPS measurements or remote sensing.
Description of measurement methods and procedures to be applied	Harvest boundaries are mapped using field GPS and then overlaid with inventory data to determine how much biomass is removed from polygon i. Inventory polygons will be adjusted to match harvest boundaries.
Frequency of monitoring/recording	Annually.
Value applied	Modeled in CBM-CFS3 by creation of Roads (2% loss to non-forest) for harvesting was accounted to estimate carbon removal due to other activity.
Monitoring Equipment	Field GPS measurement and remote sensing.
QA/QC procedures to be applied	See QA/QC procedure for carbon stock calculation (Appendix P) Ground truthing or remote sensing information.

Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Equation 37, Section 8.2 of VM0012.
Comments	-
Data / Parameter	$f_{PRJ,BLOWDOWN,i,t}$
Data unit	unitless; $0 < f_{PRJ,DAMAGE,i,t} < 1$
Description	The annual proportion of live aboveground tree biomass subject to blowdown in polygon, i, year, t.
Source of data	Included within the natural mortality factors in CBM-CFS3. Permanent sample plots Field GPS measurements or remote sensing.
Description of measurement methods and procedures to be applied	If applicable, measured in plots..Field GPS measurement or remote sensing for areas >4 ha which are then updated in inventory polygons.
Frequency of monitoring/recording	Intervals of ≤ 5 years for permanent sample plot remeasurements. or annually if field GPS or remoted sensing is required.
Value applied	Zero for the baseline and project ex-ante calculations (part of the natural mortality modeling in CBM-CFS3).
Monitoring Equipment	. Remote sensing or GPS; field plot measurement equipment.
QA/QC procedures to be applied	See QA/QC procedure for carbon stock calculation (Appendix P). Ground truthing or remote sensing information.
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Equation 40, Section 8.2 of VM0012.
Comments	-

Data / Parameter	$f_{PRJ,SNAGFALLDOWN,i,t}$
Data unit	unitless; $0 < f_{PRJ,SNAGFALLDOWN,i,t} < 1$
Description	The annual proportion of snag biomass in polygon, i, year, t, that falls over and thus is transferred to the LDW pool.
Source of data	. Parameter in CBM-CFS3
Description of measurement methods and procedures to be applied	Permanent sample plots; and forest inventory updates.
Frequency of monitoring/recording	Annually; Intervals of ≤ 5 years for permanent sample plot remeasurements.
Value applied	See most recent inventory for applicable monitoring period
Monitoring Equipment	Field plot measurement equipment.
QA/QC procedures to be applied	See QA/QC procedure for carbon stock calculation (Appendix P). Plot field measurement SOP
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Equation 40 & 44, Section 8.2 of VM0012.
Comments	-

Data / Parameter	$f_{PRJ,lwDECAY,i,t}$
Data unit	unitless; $0 < f_{PRJ,lwDECAY,i,t} < 1$
Description	The annual proportional loss of lying dead biomass due to decay, in polygon i, year, t,
Source of data	Permanent sample plots. forest inventory updates.
Description of measurement methods and procedures to be applied	LDW decay is estimated naturally by changes in permanent plot CWD remeasurements across multiple remeasurement periods.
Frequency of monitoring/recording	permanent sample plots must be remeasured at intervals of ≤ 5 years

Value applied	Parameter in CBM-CFS3
Monitoring Equipment	Field plot measurement equipment.
QA/QC procedures to be applied	See QA/QC procedure for carbon stock calculation (Appendix P). Plot measurement SOP.
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions
Calculation Method	Equation 41, Section 8.2 of VM0012
Comments	-

Data / Parameter	$f_{PRJ,SWDECAY,i,t}$
Data unit	unitless; $0 < f_{PRJ,SWDECAY,i,t} < 1$
Description	The annual proportional loss of snag biomass due to decay, in polygon, i, year, t.
Source of data	Permanent sample plots and forest inventory updates.
Description of measurement methods and procedures to be applied	SW decay is estimated naturally by changes in dead tree permanent plot remeasurements across multiple measurement periods.
Frequency of monitoring/recording	Intervals of ≤ 5 years for permanent sample plots.
Value applied	Parameter in CBM-CFS3
Monitoring Equipment	Field measurement equipment.
QA/QC procedures to be applied	See QA/QC procedure for carbon stock calculation (Appendix P). Plot measurement SOP.
Purpose of the Data	• Calculation of baseline emissions • Calculation of project emissions

Calculation Method	Equation 44, Section 8.2 of VM0012.
Comments	-

6.3 Monitoring Plan

The project monitoring plan will monitor changes in carbon stocks related to the calculation of VCU's prior to each verification. This will be achieved by monitoring changes in forest inventory conditions (relative to the valid starting forest inventory) using periodic re-measurement of project area permanent sample plots using both traditional ground-based measurements and updated aerial LiDAR-based data (planned every 10 years). Forest inventory conditions will be compared against modeled carbon stocks (Appendix P) and an uncertainty factor will be calculated according to VM0012 requirements.

Perimeter Forest is a Canadian owner of private forestland that seeks to invest in nature through land acquisition and implementation of carbon projects. Daniel Andres, Chief of Climate and Biodiversity Operations, is responsible for overall management of the Painted Forest Project Area. All operational monitoring activating are managed by Daniel Andres. Perimeter Forest is responsible for all carbon project data analysis, modelling, project reporting, technical oversight, and advice, and will engage in other technical experts, such as Ostrom Climate, Tesera, NorthWinds and McCleans, for specialist support and specialist tasks as needed.

Project Monitoring falls under three main categories:

1. Annual inventory change monitoring
2. Leakage Monitoring
3. Forest Inventory Monitoring

1. Annual inventory change monitoring

Perimeter Forest is responsible for monitoring significant spatial changes (greater than 4 ha) to the Project Area and incorporating any significant change into subsequent verification quantifications. Annual inventory change monitoring is done by field reconnaissance observations (ground and helicopter) and analysis of satellite data for changes in landcover (Sentinel data) and fire activity (MODIS). Detection of significant spatial changes will prompt updates to spatial database and project inventory. Perimeter Forest undertakes various other property monitoring activities as part of implementation of the Painted Forest Management Plan (which is an ongoing document that does not contain an expiry date), FSC certification, and other research monitoring activities through collaborations with organizations such as Sault College.

Specific to the carbon project, Perimeter Forest monitors the Project Area annually for:

a. Natural disturbance events >4 ha (i.e. fires, high mortality pest and disease areas, blow-down areas, slides, etc.) (using satellite imagery and provincial sources).
b. Planned project activity results (i.e. timber harvesting, road construction, or other management activities > 4 ha affecting carbon stocks).
c. Unplanned man-made disturbances (i.e. non-de minimis illegal or unplanned harvests, if applicable (using satellite imagery and provincial sources).

The results of these monitoring activities will be digitally mapped by GPS or remote sensing data (i.e. satellite image interpretation, etc) and the Perimeter Forest inventory GIS database updated annually.

2. **Leakage Monitoring**

Perimeter Forest, or a technical specialist on their behalf such as Ostrom Climate, will complete and document the following:

A. Activity shifting leakage (annually)

B. Annual market leakage calculations (annually)

Activity shifting leakage will be reported during each verification by updating the forest management activities on other regional Perimeter Forest properties, as per data requirements in Section 5.3.

Market leakage calculations will be updated for each verification as per the data requirements of Section 5.3.

3. **Forest Inventory Monitoring**

Perimeter Forest has established and maintains a network of 104 spatially systematic permanent LiDAR calibration plots throughout the Project Area (Figure). The plots were initially established in the summer of 2022 by NorthWinds Environmental and used to develop the initial forest inventory. Perimeter Forest also collected aerial LiDAR data for the entire Project Area in summer and fall of 2022. Plots will be re-measured prior to each verification using traditional field measurements. The inventory will be updated prior to each verification and the LiDAR data is planned to be updated every 10 years. Details on the statistical methods and accuracy of the LiDAR plot measurements are detailed in the Tesera Methodology and reporting documents (Appendix I).

NorthWinds' QA/QC process is outlined in Appendix O. Perimeter Forest will also QA/QC the field data to ensure it conforms to Ostrom Climate's *Standard Operating Procedure: Permanent Sample Plot Field Measurements (SOP)* (Appendix N). Tesera also have an internal QA/QA process for the HRIS, outlined in Appendix I. All project data, including HRIS, is stored by Tesera

on behalf of Perimeter Forest (Appendix E). Additionally, hard copies of the field notes will be stored by Perimeter Forest for at least 2 years (Appendix F).

Plot network Development and Data chain of custody:

The permanent sample plot network was established consistent with the process in VM0012 v1.2:

A. **Stratification for field plot sampling:** Plot stratification was completed by Tesera using existing plot data from a previous inventory completed in 2013 by Quercus Algoma Corporation. Seven strata were identified for sampling with a total of 125 plots as described in Ostrom Climate's SOP. A statistical estimate of population variance was calculated from the previous owner's 2013 inventory plots which indicated that 59 plots would be required to produce a forest inventory within 10% of the value of the mean with a 90% confidence interval. A sampling intensity of 125 plots was chosen to ensure minimal inventory uncertainty. Once the plot field data is collected and compiled, Tesera will further segment the Project Area into "HRIS analysis units" (this is not be confused with "analysis units" as an aggregation of similar forest polygons as defined in the VM0012 methodology. Reference to "HRIS analysis units" will always include "HRIS".) used to model and predict the reporting units polygons that make up the final forest inventory (Appendix D). Once HRIS was developed across the entire property, inoperable, non-forest, and buffer areas were removed to define the THLB (project area). 104 plots of the 125 plots are within the project area and will be monitored throughout the crediting period. The project may elect to establish additional field plots in the future to improve inventory accuracy or coverage.

B. **Plot locations**: Plots were located using a spatially systematic (aka grid pattern) approach – refer to Appendix N for the approach taken. An office review was conducted to identify plot locations that were likely to land in areas of permanent stratifiable non-forest (e.g. lakes) and an alternative plot list was provided for field crews to use once they had verified that the original location was indeed non-forest. This method of pre-selected alternative plots was done to ensure sufficient spatial coverage and to ensure fieldwork efficiency (avoid time consuming travel to a plot location only to discover it is located in water and then drop the plot and not collect any data for the day) given the many lakes throughout the Project Area. Each plot is geolocated by field crews as per Tesera High Resolution Forest Inventory Methodology Report (Appendix I). Technical details on design of plot grid can be found in the Tesera High Resolution Forest Inventory Plot Sample Design document (Appendix S).

C. **Plot design:** The field plots are designed as fixed area permanent sample plots. All field procedures are documented in Ostrom Climate's Standard Operating Procedure: Permanent Sample Plot Field Measurements (Appendix N). Field measurements will capture data for both standing and laying tree biomass.

D. **Field data chain of custody:** Field data is digitally collected by NorthWinds Environmental which adheres to all professional regulations and codes of conduct for forest professionals in the province of Ontario. NorthWinds has documented their fieldwork QA/QC procedures in Perimeter Forest LP's Algoma Property Permanent Carbon Plots Field Measurements: Quality Control Report NorthWinds (Appendix O). Upon completion of digital field data collection, NorthWinds crew members and project manager will conduct an office review of all data and then physically print, date, and sign all field cards and convert to pdf for permanent custody by Perimeter Forest. If any future data discrepancies arise between digital versions of data and signed pdf version, then the signed pdf version will take primacy.

E. **Precision:** The plot network has a design target of establishing sufficient plots such that the estimate of carbon stocks across all analysis units will lie within 10% of the value of the mean at the 90-percent confidence level.

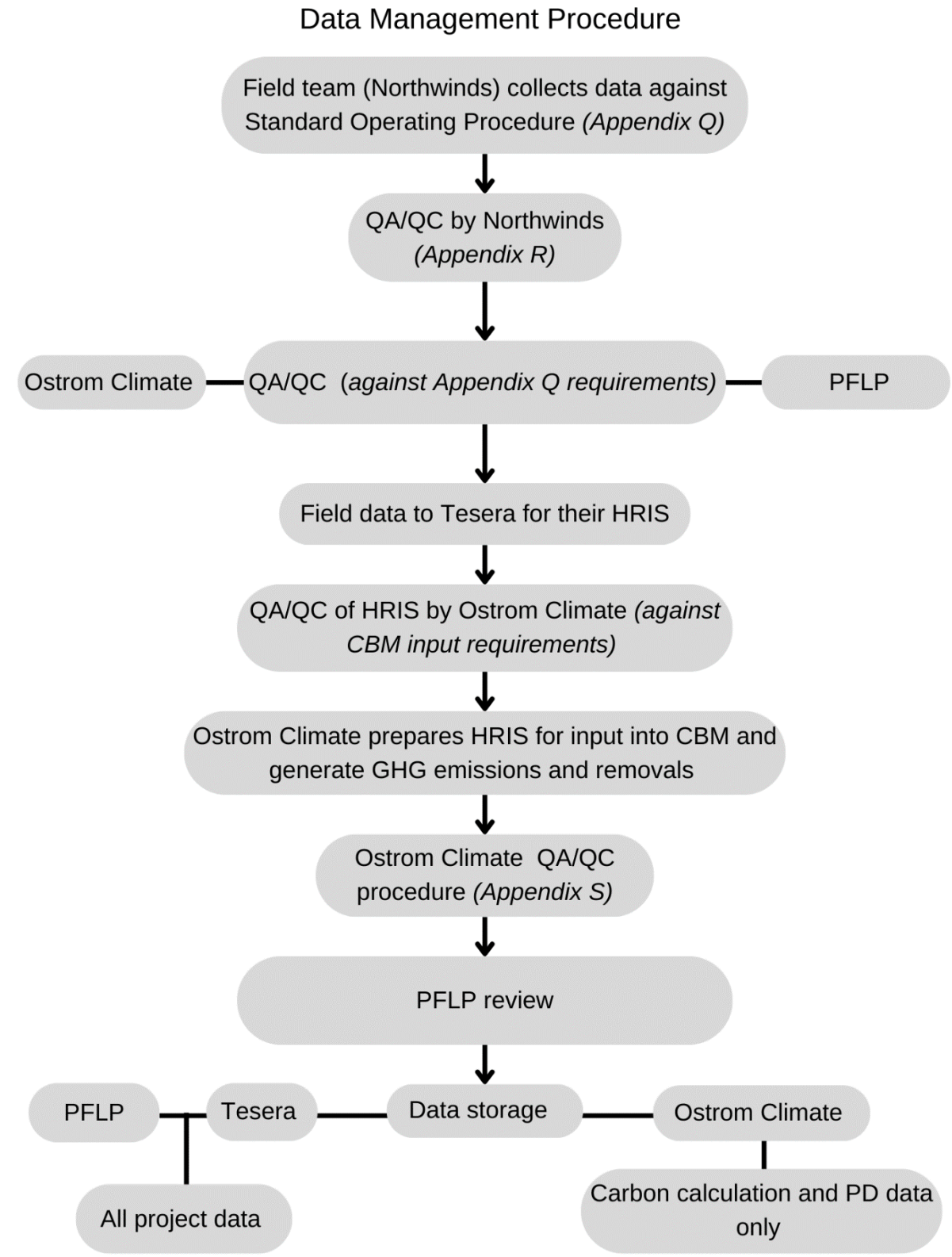
F. **Measurement and Data Analysis techniques**: All field measurement procedures are documented in the Ostrom Climate's Standard Operating Procedure: Permanent Sample Plot Field Measurements (Appendix N). This document may be refined periodically and any new plots will follow protocols from the latest version of the document. Plot data is then integrated into the Tesera Forest Inventory from which stand level carbon modelling can be completed.

   The relevant equations are included in Section 4.

G. **Plot re-measurement**: Field plots will be re-measured each within 5 calendar years of the last measurement. Re-measurement may be done using a combination of traditional field-based re-measurement and LiDAR updates. The field-based re-measurement methods will be found in the latest Ostrom Climate Fieldwork SOP document. New plots may be established in the event of disturbance or loss of original plots.

H. **Quality Assurance/Quality Control for Field Measurements**: The Ostrom Climate Fieldwork SOP document provides detailed instructions for completing accurate and repeatable field plot measurements. Northwind's field crews are trained in all technical aspects of forest measurement techniques in the province of Ontario and are supervised by registered forestry professionals (a regulated profession bound by a statutory code of ethics in Ontario). Accreditation and training records of NorthWinds crew members are available on file with Perimeter Forest. The "hot-check" QA/QC procedures described in VM0012 were documented and carried out by NorthWinds staff and an independent 3rd party contractor. The primary assessment of fieldwork QA/QC was done using "cold checks" of a minimum of 10% of all measured plots chosen at random. A complete report on the results of field QA/QC was completed by NorthWinds and contains all QA/QC results (Appendix O). The QA/QC was found to meet all VM0012 minimum thresholds.

   The following data management procedure is followed:



Leakage Monitoring Procedure

Activity shifting leakage is monitored and reported at each verification, as per methods outlined in Section 5.3. Perimeter Forest will assess and report on commercial harvesting on any other properties owned or controlled by Perimeter Forest in the region, if any, and will demonstrate that there is low or no risk of activity shifting leakage.

Market leakage is not specifically monitored by the project; however, a market leakage rating is re-calculated at each verification, following the procedures outlined in Section 5.3.

Frequency of Monitoring.

Remeasurement will be done by field plot measurement at intervals of ≤ 5 years, and Lidar and 4Band Imagery planned every 10 years. The project team will use: (i)field-based plot re-measurement; (ii) newly acquired LiDAR; and (iii) 4band imagery, in combination with cloud-computing geospatial analytics, to extrapolate a detailed forest inventory. Spatial inventory and Project Area monitoring is undertaken annually and reported at each verification.

Leakage monitoring is reported on an annual basis at each verification.

Use of monitoring data to update carbon stock calculations prior to each verification.

Data gathered through the monitoring process will be used for:

A. Updating the project forest inventory and related modeling and monitoring stratification as per section 3.6.
B. Updating leakage calculations in Section 3.9.
C. Updating error estimates used in the calculation of the uncertainty factor as per Section 8.5.3 of VM0012.
D. Updating and validating calculations of carbon stocks in Section 3.8.
E. Ostrom Climate's QA/QC procedure for carbon stock calculation is provided in Appendix S.

Updating of Monitoring Polygons (Analysis Units)

The ex-post stratification and spatial assignment of analysis units shall be updated at minimum prior to each verification, for any of the following reasons:

A. Errors in the inventory from field sampling or other sources. Any non-*de-minimis* updates due to errors in the inventory will require recalculation of both the annual project emissions and the annual baseline emissions for the current monitoring period prior to the next verification.
B. Changes to forest inventory attributes from monitoring of natural disturbance, planned/unplanned project activities or general inventory data refinements. Updates will be

made for any monitored event (at minimum >4 ha) that affects the criteria used to define an analysis unit for the project forest inventory.

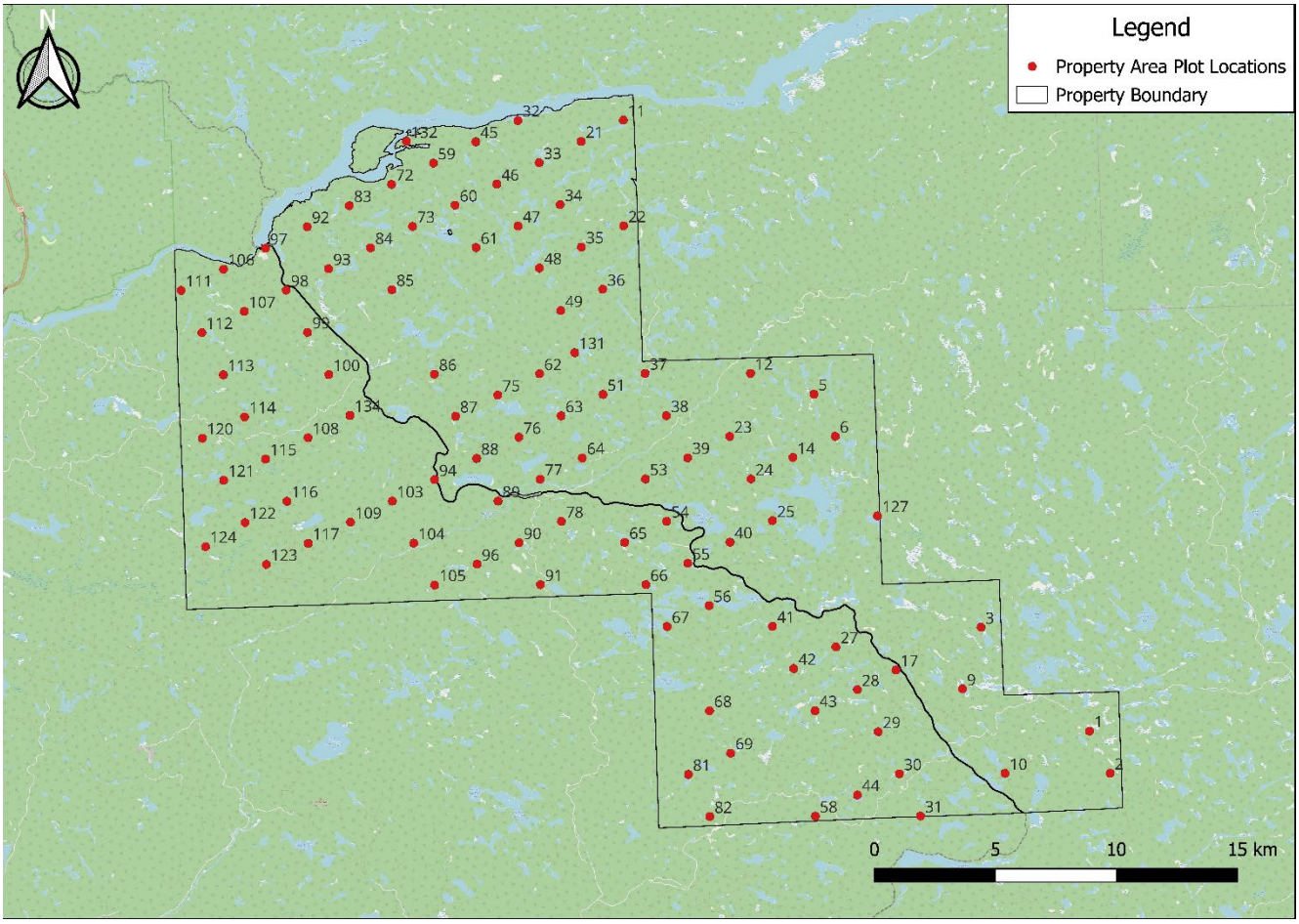


Figure 6. 2022 Permanent Calibration Project Area Plot locations of 104.

Any non-conformities with the validated monitoring plan will be considered on a case-by-case basis, and addressed either by amendment to conform with the validated monitoring plan or by a deviation from it to be included in the Monitoring Report of the next verification.

Additionally, at each verification, Perimeter Forest will review current and up-to-date IPCC literature, and Federal and Provincial literature relating to climate trends and projections for the region, making particular note of the parameters identified in the AFOLU non-permanence risk tool including temperature related, precipitation and moisture related, wind related, and any additional parameters that may be included in future versions of said risk tool. The risk tool scores and supporting evidence will then be reviewed and updated as required to ensure consistency with the new and updated literature.

7 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

7.1 Data and Parameters Monitored

Data / Parameter	$A_{PRJ,i}$
Data unit	Ha
Description	Area of forest land in polygon, i
Value applied	See Table 1 for area of tolerant hardwoods, intolerant hardwoods, mixed woods, and conifer.
Comments	Value will be reviewed every monitoring period and is not expected to change over life of project

Data / Parameter	$A_{p,l,t}$
Data unit	m^2
Description	Area of sample plot in polygon, i, at time, t
Value applied	400m^2 for all sample plots. *Conifer: 19 plots* x 400m^2 = 7,600m^2 Mixed wood: 33 plots x 400m^2 = 13,200m^2 Tolerant hardwood: 52 plots x 400m^2 = 20,800m^2
Comments	-

Data / Parameter	$DBH_{,t}$
Data unit	cm
Description	Diameter at breast height measured for each tree in the sample plots at time, t.

Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx)
Comments	Detailed procedures provided in the SOP in Appendix N.

Data / Parameter	$Height_{,t}$
Data unit	m
Description	Tree height measured for each tree in the sample plots at time, t.
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx).
Comments	Detailed procedures provided in the SOP in Appendix N.

Data / Parameter	$L_{,t}$
Data unit	m
Description	Length of the transects used to determine volume of lying dead wood in the sample plots at time, t (default 100m).
Value applied	100m for all transects. See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx).
Comments	Detailed procedures provided in the SOP in Appendix N.

Data / Parameter	$d_{n,t}$
Data unit	cm
Description	Diameter of each piece n of dead wood along the transects in the sample plots at time, t.
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx).
Comments	Detailed procedures provided in the SOP in Appendix N.

Data / Parameter	$D_{LDW,c,i,t}$

Data unit	tdm/m^3
Description	Density of dead wood in density class, c along the transect in polygon, i, at time, t
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx).
Comments	Detailed procedures provided in the SOP in Appendix N.

Data / Parameter	$N_{,t}$
Data unit	unitless
Description	Total number of wood pieces intersecting transects in the sample plots at time, t
Value applied	See most recent inventory for applicable monitoring period (Biomass_Compiled data_C plots_Updated_2024.11.19.xlsx).
Comments	Detailed procedures provided in the SOP in Appendix N.

Data / Parameter	$B_{AG,i,t}$
Data unit	tdm/ha
Description	Average total aboveground biomass in polygon, i, for year, t
Value applied	Conifer: 110.31 tdm/ha Mixedwood: 144.95 tdm/ha Tolerant Hardwood: 160.92 tdm/ha
Comments	Data summarized from excel, “PlotID and FT.xlsx” workbook “Sheet1”, column

Data / Parameter	$B_{BG,i,t}$
Data unit	tdm/ha
Description	Average total belowground biomass in polygon, i, for year, t
Value applied	Conifer: 4.02 tdm/ha Mixedwood: 4.87 tdm/ha Tolerant Hardwood: 3.38 tbm/ha

Comments	Data summarized from excel, “PlotID and FT.xlsx” workbook “Sheet1”, column

Data / Parameter	$B_{TOTAL,i,t}$
Data unit	tdm/ha
Description	Average total live biomass in polygon, i, for year, t
Value applied	Conifer: 126 tdm/ha Mixedwood: 166.18 tdm/ha Tolerant Hardwood: 183.63 tdm/ha
Comments	Data summarized from excel, “PlotID and FT.xlsx” workbook “Sheet1”, column

Data / Parameter	$DOM_{LDW,i,t}$
Data unit	tdm/ha
Description	Average mass of dead organic matter contained in lying dead wood in polygon, i, year, t
Value applied	Conifer: 7.19 tdm/ha Mixedwood: 7.14 tdm/ha Tolerant Hardwood: 7.29 tdm/ha
Comments	Data summarized from excel, “PlotID and FT.xlsx” workbook “Sheet1”, column

Data / Parameter	$DOM_{SNAG,i,t}$
Data unit	tdm/ha
Description	Average mass of dead organic matter contained in standing dead wood in polygon, i, year, t
Value applied	Conifer: 8.38 tdm/ha Mixedwood: 9.39 tdm/ha Tolerant Hardwood: 5.93 tdm/ha
Comments	Data summarized from excel, “PlotID and FT.xlsx” workbook “Sheet1”, column

Data / Parameter	$f_{PRJ,NATURAL,i,t}$
Data unit	unitless; $0 < f_{PRJ,NATURAL,i,t} < 1$
Description	The annual proportion of biomass that dies from natural mortality in polygon, i, year, t.
Value applied	Internally modelled in CBM as a composite value including multiple endemic mortality agents.
Comments	CBM-CFS3 parameter default value for Boreal Shield East ecological zone. Note, this is a composite value of $f_{PRJ,NATURAL,i,t}$ + $f_{PRJ,BLOWDOWN}$

Data / Parameter	$f_{PRJ,HARVEST,i,t}$
Data unit	unitless; $0 < f_{PRJ,HARVEST,i,t} < 1$
Description	The proportion of biomass removed by harvesting from polygon, i, in year, t
Value applied	0
Comments	No harvest activities were undertaken in Project Area during the monitoring period.

Data / Parameter	$f_{PRJ,DAMAGE,i,t}$
Data unit	unitless; $0 < f_{PRJ,DAMAGE,i,t} < 1$
Description	The proportion of additional biomass removed for road and landing construction in polygon, i, year, t
Value applied	0
Comments	Project: No harvest occurred during the monitoring period, therefore no losses of productivity associated with road and landing construction are factored in. Baseline: No additional biomass removal accounted for due to landing and road construction. Road and landing construction was accounted for as follows: For clearcut: 2% of stand transitions to a 0% growth rate on the initial stand entry. No additional road and landing construction productivity losses occur at subsequent stand entries.

	Shelterwood: no productivity losses associated with road and landing construction.

Data / Parameter	$f_{PRJ,BLOWDOWN,i,t}$
Data unit	unitless; $0 < f_{PRJ,DAMAGE,i,t} < 1$
Description	The annual proportion of live aboveground tree biomass subject to blowdown in polygon, i, year, t.
Value applied	0
Comments	Value of zero applied as annual proportion of live aboveground tree biomass subject to blowdown is already included within the natural mortality factors calculated in fBSL,NATURAL,i,t, and fPRJ,NATURAL,i,t by CBM-CFS3

Data / Parameter	$f_{PRJ,SNAGFALLDOWN,i,t}$
Data unit	unitless; $0 < f_{PRJ,SNAGFALLDOWN,i,t} < 1$
Description	The annual proportion of snag biomass in polygon, i, year, t, that falls over and thus is transferred to the LDW pool.
Value applied	Softwood Stem: 0.032 Softwood Branch: 0.1 Hardwood Stem: 0.032 Hardwood Branch: 0.1
Comments	Fall down due to snags (fBSL,SNAGFALLDOWN,i,t) is incorporated into the CBM-CFS3 model utilizing default values designated by ecozone. This value is defined within the parameter "Non- Forest Initial Conditions" under the pool's softwood and hardwood stem and branch snag (four separate parameters). Default values can be found within Appendix 3 of the user guide. Default values for Boreal Shield East are used.

Data / Parameter	$f_{PRJ,lwDECAY,i,t}$
Data unit	unitless; $0 < f_{PRJ,lwDECAY,i,t} < 1$
Description	The annual proportional loss of lying dead biomass due to decay, in polygon i, year, t,

Value applied	0.0374
Comments	Modelled in CBM-CFS3. Decay rate as reported in Kurz et al. 2009, Table 4 for "Medium" CBM-CFS3 pool and as modified by temperature (Q_{10} of table). Loss pathway is further subdivided into transfer to atmosphere (P_{atm} of table) and transfer to slow dead organic matter pool (P_t of table).

Data / Parameter	$f_{PRJ,SWDECAY,i,t}$
Data unit	unitless; $0 < f_{PRJ,SWDECAY,i,t} < 1$
Description	The annual proportional loss of snag biomass due to decay, in polygon, i, year, t.
Value applied	Snag Stems = 0.0187 Snag Branches = 0.0718
Comments	Modelled in CBM-CFS3. Loss rate as reported in Kurz et al. 2009, Table 4 as subdivided into "Snag stems" and "Snag branches" CBM-CFS3 pools and as modified by temperature (Q_{10} of table). Loss pathway is further subdivided into transfer to atmosphere (P_{atm} of table) and transfer to slow dead organic matter pool (P_t of table).

7.2 Baseline Emissions

The methodology for quantifying the baseline emissions and removals is outlined in Section 5.1.

Vintage period	Estimated baseline emissions (tCO_2e)	Estimated baseline emissions from Logging, Transport, & Processing (tCO_2e)
02-September-2021 to 31-December-2021	86,795	9,110
01-January-2022 to 31-December-2022	133,946	23,062
Total	220,741	32,172

7.3 Project Emissions

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The methodology for quantifying the project emissions and removals is outlined in Section 5.2

Vintage period	Estimated project emissions (tCO_2e)	Estimated project emissions from Logging, Transport, & Processing (tCO_2e)
02-September-2021 to 31-December-2021	0	0
01-January-2022 to 31-December-2022	-90,614	0
Total	**-90,614**	**0**

7.4 Leakage Emissions

Activity Shifting Leakage

Change detection analysis was undertaken for all properties owned by the project proponent within Canada to demonstrate that no timber harvesting has shifted from the Project Area to their other owned properties during the monitoring period. The outputs are provided in Appendix R

The project proponent confirms that no timber harvesting has occurred on any properties within their ownership in Canada within this monitoring period.

Market Leakage

The methodology for quantifying market leakage is outlined in Section 5.3

A leakage factor of **15.30%** was calculated for the project.

7.5 GHG Emission Reductions and Carbon Dioxide Removals

Note: VM0012 does not allow for the separate quantification of removals and reductions

Vintage period	Baseline emissions (tCO_2e)	Project emissions (tCO_2e)	Leakage emissions (tCO_2e)	Reduction VCUs (tCO_2e)	Removal VCUs (tCO_2e)	Total VCUs (tCO_2e)
02-September-2021 to 31 - December-2021	95,905	0	14,677			69,530
01-January-2022 to 31-December-2022	157,008	-90,614	37,894			179,470
Total	**252,913**	**-90,614**	**52,571**			**249,000**

For projects required to assess permanence risk:

ii) See table below

State the non-permanence risk rating (%)	12%
Has the non-permanence risk report been attached as either an appendix or a separate document?	☒ Yes ☐ No
For ARR and IFM projects with harvesting, state, in tCO_2e the Long-term Average (LTA).	The project does not meet or exceed Verra's Harvesting Activity definition, therefore the proje is not applicable to this project.
Has the LTA been updated based on monitored data, if applicable?	☐ Yes ☐ No N/A
State, in tCO_2e, the expected total GHG benefit to date	249,000 tCO_2e
If a loss occurred (including a loss event or reversal), state the amount of tCO_2e lost:	N/A, no loss has occurred.

iii) **Note:** VM0012 does not allow for the separate quantification of removals and reductions

Vintage period	Baseline emissions (tCO_2e)	Project emissions (tCO_2e)	Leakage emissions (tCO_2e)	Buffer pool allocation (tCO_2e)	Reductions VCUs	Removals	Total VCU issuance (tCO_2e)

					(tCO_2e)	VCUs (tCO_2e)	
02-September-2021 to 31-December-2021	86,795	0	14,677	10,415			69,530
01-January-2022 to 31-December-2022	133,946	-90,614	37,894	26,947			179,470
Total	220,741	-90,614	52,571	37,363			249,000

Note: VM0012 does not allow for the separate quantification of removals and reductions.

Vintage period	Ex-ante estimated reductions/ removals	Achieved reductions/ removals	Percent difference	Explanation for the difference
02-September-2021 to 31 -	69,530	69,530	0	

December-2021				The calculations for the first monitoring period were incorporated in the calculations process for the PD validation, thus there is no difference
01-January-2022 to 31-December-2022	179,470	179,470	0	
Total	**249,000**	**249,000**	0	

APPENDICES

Appendix A	Placeholder - Intentionally Left Blank
Appendix B	Stakeholder Engagement Tracker: TPF_stakeholder_list.xlsx (Confidential)
Appendix C	PF Painted Management Plan 2024.pdf (Confidential)
Appendix D	High Resolution Forest Inventory Methodology Report for Montreal River Lands, July 2022_Tesera
Appendix E	Tesera Systems_PLFP_Data Management
Appendix F	Perimeter Forest Digital Data Management
Appendix G	PerimeterYieldCurveDevelopmentMethodology_20231106
Appendix H	Growth&Yield_PerimeterVolumes 0303_2023_MFRM
Appendix I	High Resolution Forest Inventory of the Painted Forest Montreal River Estate, Project Report, March 28, 2023_Tesera
Appendix J	High Resolution Forest Inventory Data Dictionary 28 March 2023_Tesera
Appendix K	Inventory: hris_inventory_v01_08_01.gpkg
Appendix L	Painted Forest Audit – Accuracy reporting v2 2022-11-29
Appendix M	VCS Non-Permanence Risk Tool– Verra Project Hub
Appendix N	Standard Operating Procedure Permanent Sample Plot Field Measurements, Ostrom Climate Solutions, June 9, 2022
Appendix O	Perimeter Forest LP's Algoma Property Permanent Carbon Plots Field Measurements: Quality Control Report_NorthWinds
Appendix P	Ostrom Climate Solutions: QA/QC procedure for carbon stock calculation.
Appendix Q	Placeholder - Intentionally Left Blank
Appendix R	Methodology: Change Detection Analysis as a Means to Infer Vegetation Change
Appendix S	Tesera_High Resolution Forest Inventory Plot Sample Design
Appendix T	VM0012 methodology equations and their calculations in CBM-CFS3 (can be viewed below)
Appendix U	SDG contribution evidence

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

Section	Information	Justification

Appendix T - VM0012 methodology equations and their calculations in CBM-CFS3

VM0012 Equations	Parameter	Description	Proponent Provided CBM-CFS3 model comparative description
4	ΔCBSL,G,t(tC/yr)	annual increase in tree carbon stock from growth	Description of Equations 4, 5a, 5b: Live biomass gain (ΔCBSL,G,t, Eq. 4, 5a-b) is calculated by CBM-CFS3 based on the project area and stratifications into analysis units. Regionally specific forest dynamics (Ontario as an Administrative unit & Boreal Shield East as Ecological zone for this project), and the related carbon curves, are tracked, and reported by carbon pool (e.g. Aboveground Live, Belowground Live). CBM-CFS3 applies a CF (tC/tdm) of 0.5 (page 488, Kurz et al. 2009). Additional details about related model default values, functionality, and parameters are found in Kurz et. al., (2009), Kull et al., (2019) and Li et al., (2003).
	ABSL,i(ha)	area (ha) of forest land in polygon, i	
	GBSL,i,t(tdm/ha/yr)	annual increment rate in tree biomass (t d.m. ha-1 yr-1), in polygon, i	
	CF(tC/tdm)	carbon fraction of dry matter t C t-1 d.m. (IPCC default value = 0.5).	
5a	GBSL,i,t(tdm/ha/yr)	annual increment rate in tree biomass (t d.m. ha-1 yr-1), in polygon, i	CBM-CFS3 estimates growth in C increments in preparation for a simulation. The model converts merchantable volume yield tables into C increment tables that provide biomass C increments for each biomass pool, referenced to stand age provided as model input in inventory. The procedure starts with the softwood and hardwood merchantable volume from the yield tables being converted to biomass in units of dry matter using the appropriate volume-to-biomass equations by Boudewyn et al., (2007). Stem wood and stem bark biomass is split, and the model assigns the merchantable portion to the "merchantable + bark" pool. The tops and stumps portion of the stem wood and stem bark are assigned to the "other wood + bark" pool. The CBM-CFS3 also assigns the stem wood and bark biomass for non-merchantable, saplings and all branches to the other wood pool. Foliage remains in a separate pool. The CBM-CFS3 converts units of dry matter to mass of C using a conversion factor of 0.5 g C/g dry matter. The annual change in C stock from one age to the next is saved in the growth increment array. Once the aboveground C increment is calculated, the CBM-CFS3 then calculates the belowground biomass and C increment using equations from Li et al., (2003; Page 130)
	GBSL,AG,i,t(tdm/ha/yr)	annual aboveground biomass increments rates	
	GBSL,BG,i,t(tdm/ha/yr)	annual belowground biomass increment rates	
5b	GBSL,BG,i,t(tdm/ha/yr)	annual belowground biomass increment rates	
	GBSL,AG,i,t(tdm/ha/yr)	annual aboveground biomass increments rates	
6	ΔCBSL,L,t(tC/yr)	annual decrease in live biomass tree carbon from live biomass loss	Description of Equation 6,7,8: Live biomass loss (ΔCBSL,L,t, Eq. 6) is calculated by CBM-CFS3 based on the Disturbance Events input

	LBLBSL,NATURAL,i,t(tdm/yr)	annual loss of live tree biomass due to natural mortality in polygon, i	by the user to account for commercial felling and loss of productive forest area to roads and landings.
	LBLBSL,FELLINGS,i,t(tdm/yr)	annual loss of live tree biomass due to commercial felling in polygon, i	
	LBLBSL,OTHER,i,t(tdm/yr)	annual loss of live tree biomass from incidental sources in polygon, i	
	CF(tC/tdm)	carbon fraction of dry matter; t C t-1 d.m. (IPCC default value = 0.5).	
7	LBLBSL,NATURAL,i,t(tdm/yr)	annual loss of live tree biomass due to natural mortality in polygon, i	FBSL,NATURAL,i,t is the biomass turnover in the model and the CBM-CFS3 uses biomass turnover to represent natural mortality of biomass. Ecosystem processes represented by these parameters include tree stem, foliage, branch, and root mortality. The model estimates biomass turnover using annual biomass turnover rates (% mortality per year) for most stand growth up until the point of natural stand break-up where yield curves decline depending on the ecozone. After this point, turnover from each biomass C pool is added to losses caused by stand break-up and natural mortality. After the CBM-CFS3stimates biomass turnover, it uses litterfall transfer rates to assign the carbon to different DOM pools as specified in the model's structure (Kurz et al., 2009, Page 489).
	ABSL,i(ha)	area (ha) of forest land in polygon, i	
	LBBSL,i,t(tdm/ha)	average live tree biomass (t d.m. ha-1) in polygon, i	
	fBSL,NATURAL,i,t(unitless)	annual proportion of biomass that dies from natural mortality in polygon, i	
8	LBLBSL,FELLINGS,i,t(tdm/yr)	annual loss of live tree biomass due to commercial felling in polygon, i	LBLBSL,FELLINGS,i,t is the annual loss of live tree biomass due to commercial felling in polygon i, year t in Equation 8. Clearcut harvest without salvage" (85% biomass removal) and Shelterwood harvest (through CBM-CFS3 "Partial Cutting" disturbance with 50% biomass removal, followed by clearcut without salvage 20 years later) are applied within CBM's harvest schedules.
	ABSL,i(ha)	area (ha) of forest land in polygon, i	
	LBBSL,i,t(tdm/ha)	average live tree biomass (t d.m. ha-1) in polygon, i	
	fBSL,HARVEST,i,t(unitless)	proportion of biomass removed by harvesting from polygon, i	
9	LBLBSL,OTHER,i,t(tdm/yr)	annual loss of live tree biomass from incidental sources in polygon, i	LBLBSL,OTHER,i,t: 0%, however, creation of ROADS (2% of harvested area transitions to 0% growth rate Growth & Yield curve to account for harvesting) is used to account for road and landing infrastructure. . CBM-CFS3 estimates the biomass loss because of "creation of non-Forest (roads) and this change will be reflected via Equations 4 and 5 (a & b). Our model simulations in CBM-CFS3 via Transitions will apply a 2% loss of productive forest area from every hectare harvested (2% of harvested area transitions to non-forest. This approach matches modelling conducted in Woodstock. The simple flow of CBM-CFS3 is that the simulation of growth causes carbon to enter the forest ecosystem as living biomass (net
	ABSL,i(ha)	area (ha) of forest land in polygon, i	
	LBBSL,i,t(tdm/ha)	average live tree biomass (t d.m. ha-1) in polygon, i	
	fBSL,DAMAGE,i,t(unitless)	proportion of additional biomass removed for road and landing construction in polygon, i	

			biomass gain; Aboveground and belowground biomass carbon). Simulation of turnover and disturbance processes causes the transfers of carbon from biomass to the dead organic matter (DOM) pools. Harvesting and creation or roads (through Transitions to Non- Forest) causes the loss of carbon from the ecosystem to the forest products pool. Therefore, the CBM-CFS3 Outputs: biomass carbon (Aboveground + Belowground), DOM incorporates the increment due to growth and losses due to harvest disturbances and biomass turnover for natural mortality. Hence, Equation 6-9 are handled internally by CBM-CFS3.
10	ΔCBSL,DOM,t(tC/yr)	annual change in carbon stocks in DOM	Description of Equation 10-17. Dead organic matter dynamics (ΔCBSLDOM,t, Equation 10, 11a-b, 12, 13, 14a-b, 15, 16, 17a-d) are calculated by CBM-CFS3 based on the project area stratifications, regionally specific forest dynamics and the related carbon curves discussed above. CBM-CFS3 applies a CF (tC/tdm) of 0.5 (page 488, Kurz et al. 2009). Default parameters and algorithms within the model track all stands dead wood dynamics, including standing dead, downed dead, and below ground dead organic matter. CBM-CFS3 uses the regionally specific variant data and related parameters to model and track dead organic matter between carbon pools (Aboveground Dead (i.e. Stem Snags), Belowground Dead, Aboveground Slow DOM (VM0012 calls this Lying Dead Wood). • Table 3 – Range of biomass turnover and litterfall transfer rates (Kurz et al., 2009; Page 490) • Table 4 – The parameters used to simulate DOM dynamics in CBM-CFS3 (Kurz et al., 2009; Page 491) Net merchantable C in stem wood is directed to the forest products pool at the time of harvest, and following bucking of trees into products and deductions of branches, tops, and stumps (i.e. slash) go into DOM pools and DOM pools are created according to Table 3 and Table 4 rates and parameters. Region specific default values for proportion of merchantable tree left on site due to tops and stumps (fBSL,BUCKINGLOSS,i,t) is incorporated into CBM-CFS3 as a result of each disturbance and ecozone applied in the modelling. 15% (0.15) of volume harvested
	ΔCBSL,LDW,t(tC/yr)	change in lying dead wood (LDW) carbon stocks in year, t	
	ΔCBSL,SNAG,t(tC/yr)	change in snag carbon stock in year, t	
	ΔCBSL,DBG,t(tC/yr)	change in dead belowground biomass carbon stock in year, t	
11a	ΔCBSL,LDW,t(tC/yr)	change in lying dead wood (LDW) carbon stocks in year, t	
	LDWBSL,IN,i,t(tdm/yr)	annual increase in LDW biomass for polygon i, year, t	
	LDWBSL,OUT,i,t(tdm/yr)	annual loss in LDW biomass through decay, for polygon i, year, t	
	CF(tC/tdm)	carbon fraction of dry matter (IPCC default value = 0.5).	
11b	LDWBSL,i,t+1(tdm)	total mass of lying dead wood accumulated in polygon i , at time, t+1	
	LDWBSL,i,t(tdm)	total mass of lying dead wood accumulated in polygon i , at time, t	
	LDWBSL,IN,i,t(tdm/yr)	annual increase in LDW biomass for polygon i, year, t	
	LDWBSL,OUT,i,t(tdm/yr)	annual loss in LDW biomass through decay, for polygon i, year, t	
12	LDWBSL,IN,i,t(tdm/yr)	annual increase in LDW biomass for polygon i, year, t	

	LBLBSL,NATURAL,i,t(tdm/yr)	annual loss of live tree biomass due to natural mortality in polygon, i	is transferred to the DOM because of forest processing (i.e. bucking) and does not transfer to the Forest Products Pool. Similarly, fall down due to snags (fBSL,SNAGFALLDOWN,i,t) is incorporated into the CBM-CFS3 model utilizing default values designated by ecozone. This value is defined within the parameter "Non- Forest Initial Conditions" under the pool's softwood and hardwood stem and branch snag (four separate parameters). Default values can be found within Appendix 3 of the user guide (snip of values for the Boreal Shield East ecozone). Further support of the above is provided in Boudewyn equations. All provinces except BC uses Gross Merch as an input for the CBM Curves. "Gross merchantable volume is the volume of the stem, excluding bark, stump and top and varies among the jurisdictions depending on harvest utilization limits. Net merchantable volume is equal to gross merchantable volume minus reductions for decay, waste and breakage." (pg 2-CBM User guide). Waste (i.e. bucking loss is thus accounted for in the model's conversion of gross to merch volume and the decay pools accounted for as noted above. fBSL,BLOWDOWN,i,t,: The proportion of live aboveground tree biomass subject to blowdown in polygon, i, year, t, in the baseline. Included within the natural mortality factors calculated in fBSL,NATURAL,i,t, fPRJ,NATURAL,i,t by CBM-CFS3. Zero for the baseline and project ex-ante calculations (part of the natural mortality modeling in CBM-CFS3).
	LBLBSL,FELLINGS,i,t(tdm/yr)	annual loss of live tree biomass due to commercial felling in polygon, i	
	LBLBSL,OTHER,i,t(tdm/yr)	annual loss of live tree biomass from incidental sources in polygon, i	
	Ri(unitless)	the root:shoot ratio in polygon, i	
	fBSL,BLOWDOWN,i,t(unitless)	annual proportion of live aboveground tree biomass subject to blowdown in polygon, i, year, t	
	fBSL,BRANCH,i,t(unitless)	annual proportion of aboveground tree biomass comprised of branches > 5 cm diameter in polygon, i	
	fBSL,BUCKINGLOSS,i,t(unitless)	annual proportion of the log bole biomass left on site after assessing and/or merchandizing the log bole for quality, in polygon, i	
	SNAGBSL,i,t(tdm)	total mass of the snag pool in polygon, i, year, t	
	fBSL,SNAGFALLDOWN,i,t(unitless)	annual proportion of snag biomass in polygon, i, year, t, that falls over and thus is transferred to the LDW pool	
13	LDWBSL,OUT,i,t(tdm/yr)	annual loss in LDW biomass through decay, for polygon i, year, t	
	LDWBSL,i,t(tdm)	total mass of lying dead wood accumulated in polygon i , at time, t	
	fBSL,lwDECAY,i,t(unitless)	annual proportional loss of lying dead biomass due to decay, in polygon i, year, t	
14a	ΔCBSL,SNAG,t(tC/yr)	change in snag carbon stock in year, t	
	SNAGBSL,IN,i,t(tdm/yr)	annual gain in snag biomass for polygon i, year, t	
	SNAGBSL,OUT,i,t(tdm/yr)	annual loss in snag biomass through decay, or falldown (i.e, transfer to the LDW pool)	
	CF(tC/tdm)	carbon fraction of dry matter (IPCC default value = 0.5).	

14b	SNAGBSL,i,t+1(tdm)	total mass of snags accumulated in polygon i, at time t+1
	SNAGBSL,i,t(tdm)	total mass of snags accumulated in polygon i, at time t
	SNAGBSL,IN,i,t(tdm/yr)	annual gain in snag biomass for polygon i, year, t
	SNAGBSL,OUT,i,t(tdm/yr)	annual loss in snag biomass through decay, or falldown (i.e, transfer to the LDW pool)
15	SNAGBSL,IN,i,t(tdm/yr)	annual gain in snag biomass for polygon i, year, t
	LBLBSL,NATURAL,i,t(tdm/yr)	annual loss of live tree biomass due to natural mortality in polygon, i
	Ri(unitless)	the root:shoot ratio in polygon, i
	1-fBSL,BLOWDOWN,i,t(unitless)	proportion of live tree aboveground biomass that dies in polygon, i, year, t, but remains as standing dead organic matter (i.e., snags)
16	SNAGBSL,OUT,i,t(tdm/yr)	annual loss in snag biomass through decay, or falldown (i.e, transfer to the LDW pool)
	SNAGBSL,i,t(tdm)	total mass of snags accumulated in polygon i, at time t
	fBSL,SWDECAY,i,t(unitless)	annual proportional loss of snag biomass due to decay, in polygon, i, year, t
	fBSL,SNAGFALLDOWN,i,t(unitless)	annual proportion of snag biomass in polygon, i, year, t, that falls over and thus is transferred to the LDW pool
17a	ΔCBSL,DBG,t(tC/yr)	annual change in DOM derived from dead belowground biomass
	DBGBSL,IN,i,t(tdm/yr)	annual gain in dead belowground biomass for polygon i, year, t
	DBGBSL,OUT,i,t(tdm/yr)	annual loss in dead belowground biomass through decay
	CF(tC/tdm)	carbon fraction of dry matter (IPCC default value = 0.5).

17b	DBGBSL,i,t+1(tdm)	total quantity of dead belowground biomass accumulated in polygon i, at time, t+1	
	DBGBSL,i,t(tdm)	total quantity of dead belowground biomass accumulated in polygon i, at time, t	
	DBGBSL,IN,i,t(tdm/yr)	annual gain in dead belowground biomass for polygon i, year, t	
	DBGBSL,OUT,i,t(tdm/yr)	annual loss in dead belowground biomass through decay	
17c	DBGBSL,IN,i,t(tdm/yr)	annual gain in dead belowground biomass for polygon i, year, t	
	ABSL,i(ha)	area (ha) of forest land in polygon, i	
	LBBSL,i,t(tdm/ha)	average live tree biomass (t d.m. ha-1) in polygon, i	
	Ri(unitless)	the root:shoot ratio in polygon, i	
	fBSL,NATURAL,i,t(unitless)	annual proportion of biomass that dies from natural mortality in polygon , i	
	fBSL,HARVEST,i,t(unitless)	proportion of biomass removed by harvesting from polygon, i	
	fBSL,DAMAGE,i,t(unitless)	proportion of additional biomass removed for road and landing construction in polygon, i	
17d	DBGBSL,OUT,i,t(tdm/yr)	annual loss in dead belowground biomass through decay	
	DBGBSL,i,t(tdm)	total quantity of dead belowground biomass accumulated in polygon i, at time, t	
	fBSL,dgbDECAY,i,t(unitless)	annual proportional loss of dead belowground biomass due to decay, in polygon i, year, t	
28a	CACTUAL,i,t(tC)	carbon stocks in all selected carbon pools in polygon, i, year, t	Description of Equation 28a-28e. Total biomass (aboveground + belowground) carbon stocks for the stand were calculated (BTOTAL,i,t: Equation 28b-d) using equations embedded in the CBM-CFS3 and output by representative carbon curves and tracked by individual carbon pools as described in 2019 CBM-CFS3 user guide (Kull et al., 2019). The CBM-CFS3 converts the

			merchantable volume per ha reported by the growth curves (i.e., yield tables) to tonnes of carbon through species-specific allometric equations (Boudewyn et al., 2007, Page 24) (used as Biomass Expansion and Conversion Factors, without any additional value of wood density). Below-ground biomass is calculated from the above-ground estimations using Li et al., (2003) equations. The CBM-CFS3 uses biomass turnover to represent mortality of biomass and litterfall rates to represent the transfer of the dead biomass to one or more DOM pools. Ecosystem processes represented by these parameters include tree, foliage, branch and root mortality. The model estimates biomass turnover using annual biomass turnover rates (% mortality yr−1) for most stand development up until the point of natural stand break-up where yield curves decline. The transfer rates are shown in screenshot table from Kurz et al., 2009 (Pages: 489, 490)