



VERIFICATION REPORT

ACR VERIFICATION OF THE BEAR CREEK WATERSHED FOREST CARBON PROJECT (ACR272)- REPORTING PERIOD 2

Date: 10/27/2020

Version: 1.5

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Project Name	Bear Creek Watershed Forest Carbon Project
Project ID	ACR272
Reporting Period	10/1/2015 – 12/31/2019
Client	City of Astoria
Date of Issue	10/27/2020
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Summary

The Bear Creek Watershed lies in the northwest corner of Oregon, about 10 miles southeast of the City of Astoria containing approximately 3,700 acres, of which 3,422 acres are classified as commercial forestland that comprise the project area. The forest is predominately conifer species including Douglas fir, Sitka spruce, western hemlock and western redcedar with scattered areas of mixed hardwoods (red alder and bigleaf maple).

The purpose of this improved forest management carbon project is to increase the forest carbon stocks during the project crediting period by extending the rotation age of the standing timber. This will be accomplished by harvesting less timber volume as compared to growth over the project crediting period. The planned harvest levels over the project period are well below the volumes permissible under federal and state laws, including Oregon's Forest Practice Act and the implementing regulations.

The objectives of this project are to generate non-timber revenue over the project period which support important City of Astoria capital improvement projects, while maintaining water quality, protecting fish and wildlife species, and improving the forest health and resiliency. The carbon revenue will replace some forgone timber harvest revenue over the project crediting period.

This report presents the results of the project's second verification to the American Carbon Registry (ACR) Standards. Its purpose is to systematically assess and report the project's conformance with the ACR Standards' requirements corresponding to the second reporting period from 10/1/2015 – 12/31/2019. The evaluation included document analysis; interviews with stakeholders; and observations and measurements made directly in the field, while considering a representative sample of the project activities and sites. The scope of the verification included the ACR verification of the project's second monitoring period to determine the project's conformance with the ACR Standard (v4.0), the ACR Improved Forest Management Methodology, supporting ACR Program documents, and the validated GHG Plan.

The verification was performed through a combination of document review, interviews and communications with relevant personnel (Project Proponents, technical consultants, contractors, and regulators), as well as completing an on-site inspection. The site visit to the project was conducted on 7/16/2020, in Astoria, OR USA. The verification process included several official and documented exchanges between the verifier team and the project proponents in order to gather additional information for review and for examination of compliance with all applicable criteria. These exchanges included 2 rounds of an Issues Log produced by S&A to which the project proponents were required to respond, and for which 6 Non-Conformances, 6 Clarification requests, and 5 New Information Requests were identified. Verifiers confirmed in an email to the project proponents dated 24 September 2020 that all remaining issues were satisfied in the responses provided in the Issues Log.

After all identified issues were adequately resolved, S&A Carbon drafted this final verification report and deems, with a reasonable level of assurance, the project is in conformance with all of the requirements in the ACR Standard (v4.0), without qualifications or limitations. The project has been implemented in accordance with the validated GHG Plan over the initial monitoring period with no deviations from the described project activities in the GHG Plan or from the applied ACR IFM methodology.

S&A Carbon is able to issue a positive verification opinion for the 113,496 tCO₂e of verified total emissions reductions, as reported in the Monitoring Report dated 25 October 2020. The verification assessment

covered the monitoring period from 10/1/2015 – 12/31/2019 and verified the calculated GHG emission reductions were achieved during the monitoring period with a reasonable level of assurance. The overall risk rating was 16%. The total number of credits to be deposited in the buffer account for this monitoring period is 18,160 tCO₂e.

Abbreviations

ACR	American Carbon Registry
AFOLU	Agriculture, Forestry and Other Land Use
ANSI	American National Standards Institute
BMP	Best Management Practices
CO ₂ e	Carbon Dioxide Equivalent
EPA	Environmental Protection Agency
ERTs	Emission Reduction Tons
GHG	Greenhouse Gas
HWP	Harvested Wood Products
ICS	Initial Carbon Stocks
IFM	Improved Forest Management
NRCS	USDA Natural Resource Conservation Service
OP	Offset Provider
OPR	Offset Project Registry
PD	Project Developer
PDD	Project Data Document
PP	Project Proponent
RPF	Registered Professional Forester
S&A	S&A Carbon
TC	Technical Consultant
t	Metric Tonnes
USDA	United States Department of Agriculture
U.S.A	United States of America
VVB	Validation & Verification Body
VCS	Verified Carbon Standard

1 Introduction

S&A Carbon (S&A) has been asked by L&C Carbon to verify the emission reductions generated by the *Bear Creek Watershed Forest Carbon Project* (the Project). The verification process is required by the American Carbon Registry's Improved Forest Management Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal U.S. Forestlands (ACR IFM Methodology, v1.1). S&A verification activities began on 6/18/2020. This report presents the findings from the verification of the project's greenhouse gas (GHG) emission reductions/enhancements.

The Offset Project Registry (OPR) for this project is the American Carbon Registry (ACR), listed as ACR272.

1.1 Project Participants

Role	Organization Name	Main Contact Information and Person
Project Proponent (PP)	City of Astoria	Jeff Harrington Public Works Director 1095 Duane Street Astoria, Oregon 97103 (503) 338-5177 jharrington@astoria.or.us
Technical Consultant (TC)	L&C Carbon	L&C Carbon 710 SW Carmen Heights Dr Dundee, OR 97115 (503) 449-6957 davidford27@gmail.com

Entities listed in the table above are collectively referred to as project participants throughout this document.

1.2 Description of Project

The Bear Creek Watershed lies in the northwest corner of Oregon, about 10 miles southeast of the City of Astoria and contains approximately 3,700 acres, of which 3,422 acres are classified as commercial forestland that comprise the project area. The forest is

predominately conifer species including Douglas fir, Sitka spruce, western hemlock and western redcedar with scattered areas of mixed hardwoods (red alder and bigleaf maple).

The purpose of this improved forest management carbon project is to increase the forest carbon stocks during the project crediting period by extending the rotation age of the standing timber. This will be accomplished by harvesting less timber volume as compared to growth over the project crediting period. The planned harvest levels over the project period are well below the volumes permissible under federal and state laws, including Oregon's Forest Practice Act and the implementing regulations.

The objectives of this project are to generate non-timber revenue over the project period which support important City of Astoria capital improvement projects, while maintaining water quality, protecting fish and wildlife species, and improving the forest health and resiliency. The carbon revenue will replace some forgone timber harvest revenue over the project crediting period.

- Project Start Date: 1/1/2014
- Crediting Period Start Date: 1/1/2014
- Crediting Period End Date: 12/31/2033
- Reporting Period Start Date: 10/1/2015
- Reporting Period End Date: 12/31/2019
- Verification Start Date: 6/18/2020

1.3 Verification Objectives

This is the Project's second ACR verification. This will be a full verification, including a site visit to assess the Project's conformance with the ACR criteria outlined below, corresponding to the second reporting period from 10/1/2015 – 12/31/2019.

The objectives of verification are to evaluate the following:

- Reported GHG baseline, project emissions and emission reductions/removal enhancements, leakage assessment, and impermanence risk assessment and mitigation (if applicable);
- Any significant changes to the project procedures or criteria since the last verification; and
- Any significant changes in the GHG project's baseline emissions and emission reductions/removal enhancements since the last verification.

Further, S&A will review the Monitoring Report's GHG Assertion and any additional relevant documentation to determine:

- That the reported emissions reductions and/or removal enhancements are real;
- The degree of confidence in and completeness of the GHG assertion;
- That the project implementation is consistent with the GHG Project Plan;

- Eligibility for registration on ACR; and
- Sources and magnitude of potential errors, omissions, and misrepresentations, including:
 - o Inherent risk of material misstatement; and
 - o Risk that the existing controls of the GHG project will not prevent or detect a material misstatement.

1.4 Verification Scope and Criteria

Verification shall include examination of some or all of the following elements of the Project:

- Physical infrastructure, activities, technologies, and processes of the GHG project;
- GHG SSRs within the project boundary;
- Temporal boundary;
- Methods and calculations used to generate estimates of emissions and emission reductions/removal enhancements;
- Original underlying data and documentation as relevant and required to evaluate the GHG assertion;
- Process information, source identification/counts, and operational details;
- Data management systems;
- Roles and responsibilities of project participants or project proponent staff;
- QA/QC procedures and results;
- Processes for and results from uncertainty assessments; and
- Project-specific conformance to ACR eligibility criteria

The criteria for the offset verification services are:

- The American Carbon Registry Standard, v4.0, January 2015
- The ACR Validation and Verification Standard, v1.1, May 2018
- The ACR Forest Carbon Project Standard, v2.1, November 2010
- The Improved Forest Management (IFM) Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal U.S. Forestlands, v1.1, August 2014
- ACR Tool For Risk Analysis and Buffer Determination, v1.0
- ISO Standards 14064-2 and 14064-3, 2006
-

1.5 Materiality

The verification team must state with reasonable assurance that the percent of the total reported GHG emission reductions and removal enhancements are no more than +/- 5.00% of the “true” GHG emission reductions and removal enhancements, as calculated

by the verifier using the equation below. The analysis must consider all errors, omissions or misstatements for the subset of data included in the data checks.

$$\% \text{ Error} = \frac{\text{Project Emission Reduction Assertion} - \text{Verifier Emission Reduction Recalculation}}{\text{Verifier Emission Reduction Recalculation}} \times 100$$

1.6 Level of Assurance

S&A Carbon provides reasonable assurance that the Project meets the above criteria.

1.7 Audit Team

Role	Name
Lead Verifier	Bill Stack
Technical Reviewer	Lawson Henderson
Verification Support	Elizabeth McGarrigle, Caitlin Littlefield & Robert Turner
Verification Site Visit	Alexa Kandaris & Alex Powell
Project Manager/Approver	Alexa Kandaris

2 Audit Process and Methodology

S&A's verification audit included the following activities:

2.1 Desk Review

A document request and kickoff call agenda list were sent to the PP on 6/16/2020. A kickoff conference call was held on 6/18/2020. The project team and verifiers discussed initial findings from a desk review of submitted documents, targeting aspects of the project and supporting information that might affect the evaluation. Meeting minutes were prepared following the kickoff meeting.

The Monitoring Report and associated supporting documents were provided to the verifiers on 6/18/2020. As eligibility was validated during the initial reporting period, verifiers completed a cursory assessment of the eligibility criteria required to design, measure, and monitor the Project to the requirements of the ACR Standard and IFM Methodology. Verifiers confirmed the ACR eligibility requirements were met. The Verification Plan was completed and sent to the PP on 6/20/2020.

A draft Sampling Plan was prepared based on information available from the PP. The Sampling Plan evaluates the credibility and rigor of the verification methodology items. A risk evaluation was conducted assessing the Inventory Methodology Verification Items of the ACR Standard. Finally, the plan outlined a sampling scheme, based on the risk assessment and document reviews, to evaluate the projects monitoring system's compliance with the ACR Standard. The final Sampling Plan summarizes the results of the sampling and the data checks performed on the sampled data.

The Sampling Plan will be retained by S&A for a period of not less than 15 years following the submission of the Project Verification Statement. All material received, reviewed, and generated by the provision of Offset Verification Services will be retained by S&A for the same period.

2.2 Site Visit

A site visit was conducted by Alexa Kandarlis & Alex Powell on 7/16/2020. An opening meeting was conducted in the morning of 7/16/2020. Attendees of the site visit are as follows:

Attendee	Company	Role	Attend Opening Meeting	Attend Field Sampling	Attend Closing Meeting
Alexa Kandarlis	S&A Carbon	Verifier	X	X	X
Alex Powell	S&A Carbon	Site Visit Support	X	X	X
David Ford	L&C Carbon	Technical Consultant	X	X	X
Benjamin Hayes	Spring Board Forestry	Inventory Contractor	X	X	

During the opening meeting, the objectives of the site visit and overall verification process were presented by the verification team including an overview of the statistical t-test required for verification of the forest inventory; the qualifications of the PP were confirmed; inventory procedures and QA/QC processes & methods were discussed and clarified; and site visit logistics, personnel and vehicles/transport, and schedules were discussed and planned.

Over the course of the day, verification team activities included the measurement of 6 randomly selected forest inventory plots across the project area. Following plot data collection, the verifiers ran their verification data through the t-test. The analysis showed that the project's inventory was verifiable at a confidence interval of 90% (P value = 0.21). Further, throughout the site visit, GPS data

were collected (e.g., plot centers, strata transitions); project area boundaries and conditions of the forested conditions (e.g. species composition, age class, canopy cover) found on the project area were observed; and common practice forest management practices and forest product industries in the surrounding region were noted and assessed.

A closing meeting for the site visit was held the evening of 7/16/2020. Other topics also discussed included the preparation of the Issue Log, drafting of the verification report and proposed schedule, and reflections and learnings from the site visit.

2.3 Quantitative Review (only required for verification)

S&A conducted various quantitative analyses of the project & baseline carbon stocks, covering the relevant carbon pools quantified by the PP, and the inputs used in the calculation of the projected ex-ante emission reductions over the first 20 year crediting period as well as the actual ex-post emission reductions for the initial reporting period (10/1/2015 – 12/31/2019). The audit team implemented a cursory review of the baseline model quantification validated during the initial reporting period; and a detailed review of the estimation process for calculating project stocks including assessments of the re-stratification process, forest inventory design and specifications, measurement techniques used by the PP's inventory crew review of the species in the inventory and the correct assignment of volume and biomass equations, and checks to confirm that modeled growth used to project carbon stocks forward have been calculated and applied correctly. The modeling methods were assessed to ensure an approved model was used, that it was appropriately calibrated for the region, and inventory data flow through the modeling system was reviewed.

The reported ex-post emission reductions were confirmed by tracking all components of the PP's emission reduction calculation workbooks. This included checks that the entries for the project and baseline stocks, baseline and project harvested wood products long-term carbon storage, project risk rating determination, and leakage and uncertainty percentages are all entered and calculated correctly from their computed sources, as well as confirming the accuracy of their sources. The entire inventory treelist was independently recalculated by the verifiers and the results were compared to the PP's reported carbon stocks. Uncertainty and associated deductions were also independently calculated by the verifier. The verifier's methods are considered a complete check of the inventory data on a plot-by-plot level, using the PP's raw data and verification of all the PP's calculations for accuracy and completeness.

For projects where re-sampling is required during verification, guidance received from ACR indicated that VVBs shall resample a minimum of 5% of plots ensuring representation of all strata, and ensuring statistical agreement using a t-test at 90% confidence interval. This minimum sampling intensity was considered in the selection of sample plots to be measured by the verifiers along with allocation of sample plots among individual project strata based on risk. All trees on the selected sample plots were re-measured by the verifiers. In/out status and all diameters, species calls, defect calls, and live/dead calls were independently measured using tools identical or comparable to those used by the PP. No tree height measurements were sampled during the site visit as this field parameter was not utilized to estimate project stocks. Inventory re-measurement was confirmed to meet the ACR recommendations

and all measurement methods were conformed to be consistent with the PP's inventory specification. Carbon per plot and across the project area was calculated from the sampled plots and compared to the PP's inventory for the same plots. The verifier calculations and the PP's calculations were entered into a t-test worksheet, using the paired plot method (Two-tailed t-test, at the 90% confidence interval), and confirmed to meet the statistical standards expected by ACR for projects that require independent re-measurement for verification.

2.4 Interviews

The following is a list of the people interviewed as part of the verification. The interviewees included those people directly, and in some cases indirectly, involved and/or affected by the project activities. The training and qualifications of the PP team was confirmed by reviewing bios and team websites on 20 June 2020 (<http://lccarbon.com/>, <https://www.uidaho.edu/cnr/faculty/latta> & <http://springboardforestry.com/>). The verification team also confirmed these qualifications during interviews with PP Staff throughout the verification site visit.

Date	Name	Title
Throughout Verification	David Ford	Technical Consultant – L&C Carbon
Throughout Verification	Greg Latta	Technical Consultant – Latta Forestry
Throughout Verification	Ben Hayes	Contract Forester -Spring Board Forestry (Inventory, HWP)
8/10/2020	Ashley Latora	Stewardship Forester, Oregon Department of Forestry, Astoria District

2.5 Findings

Throughout the verification, findings were recorded by the audit team as per guidance outlined in the ACR IFM Methodology and supporting documents cited above. Any discrepancies identified by the verification team were documented in the Issues Log. The verification team has also documented in the Issues Log the source of any difference identified, including whether the difference results in a correctable error. The Issues Log was submitted to the client. Prior to completion of the verification, all identified non-conformances were required to be addressed, and correctable errors, where the error exceeded 1%, were required to be fixed. The client submitted additional evidence for S&A's evaluation for conformance during the verification process. All issues were resolved as part of the Issues Log process.

2.6 Audit Schedule

The following table summarizes the key audit milestones:

Verification Activity	Proposed Date	Actual Date
Kick-off meeting	6/18/2020	6/18/2020
Site visit*	7/16 – 7/18/2020	7/16/2020

S&A Carbon submits issues log v1.0	8/3/2020	8/11/2020
TC response to issues	8/17/2020	8/17/2020
S&A Carbon submits issues log v2.0	8/31/2020	9/4/2020
TC response to issues	9/14/2020	9/8/2020
S&A Carbon submits issues log v2.1	----	9/11/2020
TC response to issues	----	9/15/2020
S&A Carbon closes out issues log	9/28/2020	9/24/2020
S&A Carbon submits verification report for Technical Review	10/5/2020	9/29/2020
S&A Carbon submits verification report for TC review/approval	10/12/2020	9/30/2020
S&A Carbon submits final verification documents to ACR	10/15/2020	10/1/2020

2.7 Eligibility Requirements

As eligibility requirements were validated and verified during the initial reporting period, verifiers conducted a cursory review of the Project against the eligibility criteria of the ACR Standard as well as the applicability conditions of the ACR IFM methodology applied by the project and determined the project to be still eligible and applicable for the given requirements. The project applied an ACR approved methodology, Improved Forest Management Methodology for Quantifying GHG Removals and Emission Reductions through Increased Forest Carbon Sequestration on Non-Federal U.S. Forestlands, v1.1. The project was found to meet the eligibility requirements of the ACR Standards in terms of its Start Date, Minimum Project Term, Crediting Period length, Land Eligibility & Title/Ownership, Adherence to Natural Forest Management Requirements and the Permanence of the generated GHG emission reductions. It was also found to meet the applicability conditions of this methodology in terms of land ownership type, legality of harvesting activities, types of project activities and natural forest management criteria.

The project start date is 1 January 2014, which is after 1 January 2000, and is therefore eligible. The reporting period length for RP1 was less than two years, which also meets the eligibility requirement (1/1/2014 to 9/30/2015). The minimum project term stated in the GHG Plan is 40 years as required by the methodology. The Crediting period is 20 years, consistent with the applied methodology.

The project is an Improved Forest Management (IFM) project type, and has consisted of forest cover through the project start date and initiation. The current project activities include commercial harvesting. The verifiers are reasonably assured that the project area is located on non-federally owned lands within the state of Oregon, USA. The project area is composed of forest cover, made up of 100% native species. The project activity doesn't involve any use of non-native species.

The project's GHG Plan summarizes the results of the risk assessment conducted using the VCS AFOLU Non-Permanence Risk Tool (v3.2) for assessing risk and contributions to the ACR buffer, which was appropriate as the ACR tool for Risk Analysis had not yet been released at project start (2014). For this initial reporting period, the risk rating was calculated to be 12%. In accordance with the ACR IFM Methodology (Section 5B), the PP updated the risk assessment for Reporting Period 2 using the ACR Tool for Risk Analysis and Buffer Determination, which increased the risk rating to 16%. Verifiers completed a review of the percent contributions for each risk category and found the individual risk ratings reasonable, appropriate, accurate and well supported with documentation to justify the associated risks. In total, 16% of the gross emission reductions will be deposited into the ACR buffer account. This deduction is made to the gross ERT calculations produced by the PP's to determine the total tradeable balance of ERTs generated by the project during this second reporting period.

2.8 Additionality

In order to demonstrate the GHG emission reductions from the project are additional and considered to be above and beyond the "business as usual" scenario, the Project must pass the ACR three-prong additionality test prove that it currently exceeds current effective and enforced laws and regulations; exceed common practice in the relevant industry sector and geographic region; and face at least one of the three implementation barriers (financial, technological or institutional). The project's validation and verification of the initial reporting period found the Project passed this test and confirmed that it met the requirements for Additionality. For the second reporting period, verifiers completed a cursory check of the results of the three-prong additionality test completed during the initial reporting period. Based on this check, verifiers can confirm the Project passes the ACR three-prong additionality test in meeting the requirements for Additionality (see the verifiers data check log).

2.9 Permanence and Risk Mitigation

As mentioned previously, The PP updated the risk assessment for Reporting Period 2 using the ACR Tool for Risk Analysis and Buffer Determination, which increased the risk rating from 12% (RP1 used VCS AFOLU Non Permanence Risk Tool) to 16%. Percent contributions for each risk category have been applied based on guidance in the tool. In total, 16% of the gross emission reductions will be deposited into the ACR polled buffer account. This deduction is made to the calculated gross ERT calculations generated by the project to determine the total tradeable balance of ERTs for this second reporting period.

Verifiers conducted a review of the percent contributions for each risk category and concur with the percent contributions for each risk category; individual risk categories were accurately and appropriately determined with the required supporting documentation to justify the risk rating. The calculation to estimate the total risk was also completed correctly and accurately transferred to the PP's ERT workbook.

2.10 Baseline

A thorough Baseline review was required for the project's validation and initial verification, as this is a verification for the second reporting period, the degree of baseline review is reduced. Nevertheless, verifiers did trace data from the RP2 Monitoring Report and the GHG Plan back to the results of the baseline modeling and did a general review of the baseline modeling process. The level of review was not further augmented as no issues of concern surfaced during the process. The baseline modelling assumptions have been previously confirmed as being in conformance with the requirements of the ACR Standard during the last (initial) full verification. The analytical methods used to apply growth to current stocks over the first 20-year baseline period are described in the GHG Plan. The verifiers reviewed these calculations and procedures once more and found:

- The FVS model was calibrated and used appropriately;
- The application of the model results is accurate and appropriate; and
- The amount of growth predicted by the model is consistent with FIA estimates for the region and is consistent with published studies.

Baseline carbon in long-term storage in harvested wood products was calculated based on projected harvest volume removals from the FVS model. Harvest volumes were broken out into the categories of softwood sawlog, softwood pulp, hardwood pulp and hardwood sawlog by referencing the merchantability standards in FVS. Harvest volumes were converted to biomass by applying species-specific specific gravity values. Biomass values were then converted to units of tCO₂e using appropriate conversion factors. Carbon transferred into wood products was estimated by applying the appropriate mill efficiency values. Carbon in wood products was then summed across the established wood categories and distributed to various end wood product classes. Carbon in long-term storage was then summed for in-use wood products and wood products in landfills to produce annual total tCO₂e stored in in-use and landfill by applying the appropriate 100 year storage factors taken from the ACR IFM Methodology. Emissions due to burning logging slash are conservatively assumed in the baseline to be zero. Verifier checks of the baseline carbon storage in harvested wood confirmed the accuracy of the PP's ERT calculation worksheet in accordance with the ACR IFM methodology.

2.11 Leakage

According to the ACR IFM Methodology, there may be no leakage beyond de minimis levels through activity shifting to other lands owned, or under management control, by the timber rights owner. If the project decreases wood product production by greater than 5% relative to the baseline then the Project Proponent and all associated landowners must demonstrate there is no leakage within their operations – i.e., on other lands they manage/operate outside the bounds of the ACR carbon project.

The PP asserts there is no activity shifting leakage, which is supported by third party sustainable forest management certification (Forest Stewardship Council since 2005) and, as described in the GHG Plan, the City of Astoria does not own any other forestland

outside of the project area. Quantification of leakage of the project is therefore limited to market leakage. Market leakage was determined by quantifying the merchantable carbon removal in both the baseline and with-project scenarios. Carbon in long-term storage in in-use wood products and landfills was used to assess relative amounts of total wood products produced in the baseline and project. The decrease in wood production relative to the baseline was calculated to determine the applicable market leakage discount factor in accordance with the methodology. Since the project activities decrease total HWP produced by the project relative to the baseline by 25% or more over the crediting period, hence the assigned market leakage deduction is 40%. This leakage deduction was found to be correctly determined and accurately applied in the PP's supporting ERT calculation workbook for this reporting period.

2.12 Monitoring Requirements

Section D of the GHG Plan outlines the project's monitoring plan. All appropriate data and parameters to be monitored over the life of the project are outlined including details on the unit of measurement for the data/parameter, a description of the parameter, the data source used, the measurement methodology, monitoring frequency, values applied, procedural and QA/QC references, the purpose of the data and the calculation method. The monitoring plan also indicates that each year, the project will sign and submit to ACR the required attestations confirming; the continuation of the project activities, that ownership of the project area remains clear and uncontested, and a disclosure of any negative environmental or community impacts and if necessary documented plans to mitigate any reported negative environmental or community impacts. Signed copies of this required Attestation was provided for each vintage year during this second reporting period.

Project monitoring is generally focused on the project's on-site carbon stocks through updates to the projects forest inventory data. A full re-inventory of the project area is to take place at least twice over each decade following validation & initial verification to allow for calibration of the growth model and improve the project's carbon sequestration estimates. In additional, affected portions of the project area will be updated periodically in response to natural disturbance events of significant forest management activities. If impacts from such events are significant, the affected areas will be re-inventoried and the project scenario model will be adjusted to reflect current on-site carbon stocks. For those years in-between when an updated inventory is carried out, on-site carbon stocks will be monitored through forest growth and yield modeling. Beyond forest inventory updates, the PP continually monitors the general health and condition of the forest through the course of regular forest management activities including road maintenance, harvesting, water quality and quantity monitoring or boundary maintenance.

QA/QC procedures have been established as part of the monitoring plan and are outlined in section D2 of the GHG Plan and the Inventory SOP document (i.e., Carbon Cruise SOP). Both forest and desk based QA/QC procedures are established. Procedures are described more fully in these noted documents that include (1) collecting reliable field measurements (contractor measurement tolerances & checking cruising); (2) verifying data entry techniques; and (3) data storage.

A check cruising report was not completed during data collection of the 2019 Inventory. In response to findings raised by the verifiers, the PP reported six plots were checked cruised on November 16, 2019 (~5% of the 111 plots). Two cruisers installed and measured the 111 plots within the project area (3 plots of each cruiser were checked cruised). Results of the check cruise indicated all measurements were within the tolerances specified in the Carbon Cruise SOP. There were no failed plots and no follow-up items that needed to be addressed. The TC (David Ford) has worked with the cruising contractor (Cougar Environmental) previously on other projects; verifiers confirmed during the July 2020 site visit they were well qualified and experienced.

After the inventory data was submitted the PP completed QA/QC on the data set. The contractor submitted inventory data in two separate batches. Technical consultants (David Ford and David Shoch (TerraCarbon LLC)) completed a QA/QC check on all data submitted to ensure that were no data values were out of the expected range. The final data set was used for calculating the live tree carbon stocks and the inventory statistics.

The contract forester, Ben Hayes (Springboard Forestry), manages the forestland on behalf of the City of Astoria including harvest preparation and implementation, inventory, management planning and report preparation, and database and record keeping (GIS, harvest volumes, mapping, etc.). The PP's forest management records and associated GIS data are stored locally and on cloud-based servers. The TC prepares, monitors and maintains the carbon project database. Both systems are backup on a regular basis.

While the verifiers did uncover some issues during the verification that were apparently not caught during the project's QA/QC process, the requested detail on the QA/QC procedures has been provided, and the verifiers find no reason to further question the implementation or effectiveness of the established QA/QC mechanisms. Verifiers discussed these QA/QC procedures during the verification process (Issues Log, site visit and conference calls) and found the procedures meet the ACR Standard requirements.

2.13 Community and Environmental Impacts

Community and environmental project impacts were assessed during the initial reporting period. Section F1 of the project's GHG Plan summarizes the Community and Environmental Impact Assessment addressing the requirements of the ACR Standard. Environmental benefits included reduced soil erosion, improved water quality, and diverse forest structure (for forest health resiliency) and habitat biodiversity (wildlife, fisheries, plants). The Project's harvesting plans are also designed to emulate the effects of small scale disturbances in some stands. These and other project forest management actions (i.e. extending rotations) will have environmental benefits by providing habitat openings and greater horizontal and vertical diversity within the project area over time. Community benefits include maintaining the project area's forest resources in a healthy condition will ensure the continued flow of important water supplies (quantity and quality) into the future. Project impacts have all been categorized as positive for the initial reporting period; there was no need to describe how negative impacts will be avoided or minimized.

Monitoring of the risks and impacts is covered in section D.2 of the GHG Plan which gives an outline forest inventory monitoring through on-the-ground measurements and through forest growth and yield monitoring. In addition, the PP's management staff will consistently monitor the general health and condition of the forest through the course of normal forest management activities as well as stakeholder input. For Reporting Period 2, the PP attests there were no undisclosed or unmitigated adverse environmental or community impacts. Based on verifier discussions with the PP, TC, contractors and stakeholders (Oregon Department of Forestry), project document reviews, and site visit observations, verifiers find the project still provides the same positive community and environmental impacts described during the initial reporting period.

2.14 Stakeholder Comments

The GHG Plan asserts that the Project Proponent, The City of Astoria, as a public entity provides an open process related to all decisions impacting the management of the Bear Creek Watershed project area. The management plan is maintained on the City of Astoria website and can be accessed by any person or entity for review. Any interested party can contact City staff and obtain access to the management plan if they do not have web access.

All timber harvest projects are submitted to City Council for review and approval at regularly scheduled meetings. The information related to forest management (and other activities related to the project) are published for review prior to the meeting on the City's website. Notice of the meeting agenda is also posted in the local paper. The City Council accepts public comment prior to any decision regarding individual projects. Project information is distributed to qualifying parties for review and opportunity to bid on individual projects. The project notices related to forest management activities are also posted in the local paper. Public involvement is considered in all phases of the decision process for the City of Astoria.

Discussions and actions taken by the City Council about the Bear Creek Watershed Forest Carbon project followed the City of Astoria's public notification and open hearing process. There were multiple public hearings about various aspects of the Bear Creek Watershed Forest Carbon Project over a two-year period before the City Council approved moving forward with the development of the project. There was no public dissent during the multiple public hearings regarding the actions to develop the forest carbon project. The City Council meeting minutes are available to the general public on the City of Astoria's website.

The verifiers agree with this determination considering the project ownership and design.

3 Verification Activities

3.1 Project Implementation Status

As previously described in this report, the project was validated to the ACR Standards, and its initial reporting period verified. For this second reporting period, the PP submitted a completed copy of the Monitoring Report (MR) that provides the information required in the ACR monitoring report template. The verifiers are reasonably assured there were no changes to the landowner, project area or inventory over the reporting period, and estimates of the current on-site carbon stocks based on the inventory data are provided.

As in the initial reporting period, commercial harvesting occurred during the second reporting period. Supporting worksheets for harvest volumes and calculations for associated long-term carbon storage in harvested wood products have been provided for the four vintage years during this second reporting period. Verifiers completed data checks on the harvest volumes, harvest areas, and calculations of long-term carbon storage of harvested wood products. While some revisions occurred during the verification process, discrepancies were minor, and the overall monitoring and record keeping process appears adequate to meet the requirements of the ACR Standard. Calculations of long-term carbon storage of the project's harvested wood products were correctly calculated and accurately transferred to the ERT worksheet.

The MR outlines the data and parameters monitored over the reporting period, which are found to be consistent with the data and parameters included in the monitoring plan of the GHG Plan. The MR also includes updated reporting on the project's GHG emission reductions including baseline emissions, project emissions, leakage emissions contributions to the buffer pool, and a summary of the net GHG emission reductions at the end of the second reporting period. The verifiers confirmed the accuracy of the ERT calculations and consistency with the final values reported in the MR with the supporting ERT calculation workbook (see the verifiers data check log).

Verifiers do note, the PP provided a description of corrections that were made to initial reporting period's in the ERT worksheet (i.e., adding second growth cycle between initial inventory and the end of reporting period, and adding not subtracting HWP carbon during this reporting period.). During the verification process (Issues Log), the verifiers requested further clarification from the PP. Verifiers also consulted with ACR (A.Taylor) on 23 July 2020 to request guidance on this correction. Following ACR guidance, the PP clarified the error and associated calculations and revised the ERT workbook. As the error resulted in less than 5% change in the ERTs, it did not exceed the ACR materiality threshold. Thus, no change to the calculations for the initial reporting period were required. The error correction also had no implications on ERT calculations for reporting period 2 (see issue #20-5 of the Verifier's Issues Log for additional details).

Project level live carbon stocks were projected from the original inventory data (2013) for vintage years 2016-2018. Stocks were calculated by growing live trees forward in the FVS model and removing the associated annual harvest acres. Inventory data was grown forward in one year periods in FVS, and for each plot, the average annual CO₂ growth was calculated. No burning of any biomass occurred so emissions from the burning of logging slash is considered to be zero.

A carbon inventory was completed in November 2019. The PP used this data set to estimate the project stocks for vintage year 2019. For all vintage years, only live project stocks were calculated or modeled (dead stock estimates are optional under the ACR Standard). Average carbon stock by strata was used to produce weighted total Onsite Carbon Stocks. The verifiers can confirm the PP conducted all calculations according to the IFM Methodology and found close agreement with the PP's estimate of project stocks (0.02% higher than the PP's estimate of 970,350 tCO₂e). MR reporting is consistent with the estimates shown in the ERT supporting workbook.

Verifiers note, the project stocks decreased over the reporting period, from 1,074,701 tCO₂e (2016-beginning of reporting period) to 970,350 tCO₂e (2019- end of the reporting period). While some stock removals (limited harvesting) and forest growth occurred during the reporting period, the decrease is primarily attributed to the results of the 2019 inventory that were applied at the end of the reporting period. The resulting calculated project stocks is used to "true up" the estimate of project stocks at the end of the reporting period. The project stocks for vintage years 2016-2018 are based on 2013 inventory (modeled and grown forward).

The verifiers performed checks on the ERT calculations for the second reporting period to confirm the accuracy of the PP's calculations. Reporting period ERTs were also calculated using the verifier's internal calculations of end of reporting period on-site carbon stocks as the basis for the materiality checks as presented below.

3.2 Data-Checks & Materiality

A summary of selected data checks for project are provided below. The assigned ranking reflects both the size and uncertainty associated with these SSRs. These and other data checks performed (along with narrative details of the check and results) are included in the verifiers data check log and Issues Log.

SSR (rank)	Data reviewed	Reported (PP) tCO ₂ e	Calculated (VB) tCO ₂ e	Dis- crepancy tCO ₂ e	Impact on misstatement/ conformance
	Checks performed				

Rank 1 Sum of Project stocks; beginning of RP (CP,TREE,t, CP,DEAD,t, CP,HWP,t, GHGP,t)	2013 Inventory, volume and biomass estimates, grown modeling results, grown tree list. Carbon calculations on inventory. Model appropriateness and use. Data systems.	1,070,370	1,070,370	0	No impact on Materiality
	Model performance against independent benchmarks. Checks of accumulations and correct transfer to Monitoring Report				
Comment: NA					
Rank 2 Sum of Project stocks; end of RP (CP,TREE,t, CP,DEAD,t, CP,HWP,t, GHGP,t)	2019 Inventory, volume and biomass equations, calculation methods	970,350	970,538	-188	Impact on Materiality
	Calculate carbon stocks from inventory.				
Comment: Discrepancy due to slight differences in strata averages, rounding, and minor error in PP's calculation (see Issues Log item 20-3 in Appendix B) .					
Rank 3 20 Yr Average Baseline stocks (live and dead tree CO2e) CBSL,AVE (total)	Monitoring Report and supporting modeling documents. Model appropriateness and use. Data systems.	304,253	304,253	0	No impact on Materiality
	Model calibration. Model performance against independent benchmarks. Checks of accumulations and correct transfer to Monitoring Report.				
Comment: NA					
Rank 4 Emissions Reduction at t (after buffer deduction)	Monitoring Report	95,336	95,336	0	No impact on Materiality

(CACR,t)	Checks that all PP entries are correct. Check sources. Checks that calculations within the worksheet are correct. Calculation check uses PP values.				
Comment: NA					
Rank 5 Market Leakage Discount Factor (LK)	Monitoring Report, supporting documents.	83,356 (40%)	83,356 (40%)	0	No impact on Materiality
Rank 6 Baseline Harvested Wood Products (CBSL,HWP,t)	Monitoring Report, supporting worksheets	57,925	57,925	0	No impact on Materiality
	Model results, HWP worksheet. Confirm model projections and sums. Correct use of appropriate mill efficiencies, product classes and long-term storage factors.				
Comment: NA					
Rank 7 Buffer Credits and Risk Rating (TBt)	Monitoring Report, calculation workbooks, supporting worksheets	18,160	18,160	0	No impact on Materiality
	Checks that all PP entries are correct. Check risk rating and calculations have been calculated correctly.				
Comment: NA					
Rank 8 HWP Project (CP,HWP,t)	Monitoring Report, supporting worksheets On-site observations, GIS review, interviews with the PP.	9,961	9,961	0	No impact on Materiality

	Checks of mill receipts and HWP storage calculations. Correct use of appropriate mill efficiencies, product classes and long-term storage factors.				
Rank 9 Total Uncertainty (UNct)	Monitoring Report supporting worksheets	0 (-2.91%)	0 (-2.91%)	0	No impact on Materiality
	Use PP data for initial stocks; checks the calculation of total uncertainty was done correctly. Recalculated from initial inventory.				
Comment: Below 10% threshold					

The verification team must state with reasonable assurance that the percent of the project's total reported GHG emission reductions and removal enhancements is +/- 5.00% of the "true" GHG emission reductions and removal enhancements for the reporting period, as calculated by the verifier using the equation below. The analysis must consider all errors, omissions or misstatements, for the subset of data included in the data checks. Any errors, omissions or misstatements are identified separately in the table above.

$$\% \text{ Error} = \frac{\text{Project Emission Reduction Assertion} - \text{Verifier Emission Reduction Recalculation}}{\text{Verifier Emission Reduction Recalculation}} \times 100$$

$$\text{Percent error} = \frac{[95,336 - 95,432]}{95,432} \times 100 = -0.10\%$$

Project ERTs – Verifier ERTs	Verifier ERTs	Percent Error*
96	95,432	-0.10%

*Note: In this column, a negative value represents *under-reporting* by the PP.

The materiality calculation shows the project is 0.10% under-reporting. Thus, the project is less than the 5.0% materiality threshold.

3.3 Verification Conclusion

During the verification process, the S&A verification team gathered evidence to evaluate the project design, the project implementation, and assess the accuracy of the GHG assertion associated with the reporting period.

After review of all project information, procedures, calculations, and supporting documentation, S&A confirms the Project reporting is accurate and consistent with all aforementioned criteria and requirements of the ACR Standards. S&A confirms all verification activities, including objectives, scope and criteria, level of assurance, and project documentation adhere to the ACR Standards. S&A concludes without any qualifications or limiting conditions that the Project meets the requirements of the ACR Standards.

S&A has verified the PP's Total GHG assertion of **113,496 tCO₂e** for the Reporting Period of 10/1/2015 to 12/31/2019.

Reporting Period	Total ERTs (tCO ₂ e)	Total ERTs to Buffer Pool (tCO ₂ e)	ERTs Net (tCO ₂ e)
Total for RP2	113,496	18,160	95,336

APPENDIX A: REFERENCE LIST

Project Documents

Ref #	Document Description	Filename
/R1/	Monitoring Report	Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 5_25Oct2020Appendix B_Astoria RP2 Monitoring Report_Buffer Pool Calculation_FINAL.pdf Astoria_Initial Monitoring Report_01_01_2014-09_30_2015_FINAL.pdf
/R2/	GHG Plan	Astoria_GHG Plan_FINAL.pdf Appendix A_Astoria_Forest Management Plan 2014_FINAL.pdf Appendix B_Stand List_FINAL.xlsx Appendix C_AFOLU Non-Permanence Risk Tool_FINAL.pdf Appendix D_Local Mill Log Prices_August 2015_FINAL.pdf Appendix E_COLE Report_Aug_26_9286446_PvtandStateLocal_FINAL.pdf Appendix F_ODF Class 1 Stream Map_07_27_2015_FINAL.pdf Appendix G_Inventory SOP_FINAL.pdf Appendix H_ACR_ERT worksheet_FINAL.xlsx Appendix I_Supplemental Document_Emissions Reductions Purchase Agreement_Astoria_TCT_06_04_2015.pdf

			Appendix J_Strata Map_FINAL.pdf Appendix K_FSC Certificate_City of Astoria Bear Creek Watershed_FINAL.pdf
/R3/	Calculation Workbooks	Monitoring/ER	Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_Rev_25Oct2020.xlsx
		Live Tree Calcs	Astoria_liveTreeCalcs_Rev_F_13Sept2020.xlsx
		Stand List	GHG Plan_Appendix B_Stand List REV_09_11_2020.xlsx
		Plot Calcs	Astoria_Plot_Tree_Data_Dec2019_rev_11Aug2020.xlsx
		Harvest	Astoria_ACR_Annual Harvest 2014-2019_4Sep2020.xlsx REPORTS SPUR 1 COMBO TIMBER SALE 2018 (final)_Rev_06Sept2020.xlsx
/R4/	Harvest	Bid Information	01-INVITATION TO BID- SPUR 1 COMBO 2018.pdf 02-BID FORM SPUR 1.pdf 03-CERTIFICATION OF ELIGIBILITY TO BID.pdf 04-CONTRACTANDSCOPE.pdf Award Contract - Spur 1 Combo 2018.docx awardmemo_spur1combo.docx samplesettlement.pdf
		Reports	Tblsortgrade.pdf tspcstgr_harv2018_type1.pdf tspcstgr_harv2018_type2.pdf tstats_harv2018_type1.pdf tstats_harv2018_type2.pdf tstndsum_harv2018_type1.pdf
		Maps	2_25_18harvestlayout.pdf 2_25_18harvestlayouttopo.pdf 2_25_18harvestlocation.pdf
/R5/	Modeling	Inventory	Astoria_FVS_Database.accdb AstoriaCarbBatch1.accdb FinalBatchAstoriaCarbon.accdb PLOT_Batch1.xlsx PLOT_Batch2.xlsx TREE_Batch1.xlsx TREE_Batch2.xlsx
		Modeling Procedures	Astoria_RP2_Modeling.docx

		FVS Runs	Ast_Grow_2019.bat Astoria_Data_2019.accdb FVS_Astoria_Ct.key FVS_Astoria_Grow.key FVS_Astoria_Grow.out FVS_Astoria_Plant.key FVS_Astoria_PICT.key FVS_Astoria2019_CT.accdb FVS_Astoria2019_Grow.accdb FVS_Astoria2019_Plant.accdb FVS_Astoria2019_PICT.accdb FVSpn_Astoria.exe
		NPV	AstoriaProject_2019.gms AstoriaProject_2019.lst Data_Astoria_2019.gms Data_Astoria_NYield_2019.gms Data_Astoria_XYield_2019.gms
/R6/	Inventory	Methodologies	Astoria Carbon Cruise SOPs_09Sept2019_Rev_13Sept2020.docx
		Sampling Design	Astoria sample design June2019_Rev_24Sept2020.docx AstoriaInventoryDesignMap.pdf AstoriaInventoryDesignCalcs.xlsx
		Inventory Results	Astoria_InventoryResults1-7-20_Rev_13Sept2020.docx
/R7/	Spatial	Strata	Strata GIS Layer.zip
		Harvest	FinalUnits2018.zip thinning_unit.shp vr_unit.shp
		Plots	Astoria_Inventory_Plots.lyrx Astoria_InventoryPlotCoordinates.xlsx
		Inventory	Astoria_InventoryMap.shp
		Stands	Astoria_StandMap.shp
/R8/	Forest Management	FMP	forest management plan 2014.pdf
		FSC Certification	FSC Certification 1.7.2020.pdf
/R9/	Attestations	ACR	Astoria_ACR Attestationn 2015 – Signed.pdf Annual ACR Attestation 2016 – Signed.pdf

			Astoria_ACR Attestionn 2017 - signed Jan2018.pdf Astoria_ACR Attestionn 2018 – Signed.pdf Annual ACR Attestation 2019 - Signed Jan2020.pdf
/R10/	Reference Documents	ACR Guidance	ACR_Baseline_Issues_Solutions Memo_27Aug2020.docx
		Project Accounting	Explanation of Project Accounting Correction_21July2020.docx

Verifier Documents

Ref #	Document Description	Filename
/R1/	Project Specific COI Form	ACR272_COI Form.pdf
/R2/	Verification Plan	ACR272_Verification Plan_v1.5_20201027.docx
/R3/	Sampling Plan	ACR272_Sampling Plan_v1.5_20201027.docx
/R4/	Data Check Log	ACR272_RP2_DataCheckLog_26Oct2020.xlsx
/R5/	Issues Log	ACR272_IssuesLog_v2.2_29Sept2020_Closed.docx
/R6/	Site Visit t-Test	ACR272-Bear Creek_T-Test Worksheet_20200716.xlsx

APPENDIX B: FINDINGS LIST

Verifier Issue	Issue ID:	20-1	Status: Closed	Checked by: CL	Date Identified	8-Jul-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description			Comments
ACR IFM Methodology, v1.1, section C3.1.1	Inventory SOPs	Clarification. May impact OMM or conformance.	Per the inventory design, data, and calculation documents and workbooks, a BAF of 40 was used (and an associated plot radius factor of 1.375 in the calculation workbook). The SOPs also specify 40 BAF prisms in the equipment list. In the SOP guidance on borderline trees, however, there is a note describing the plot radius factor to be used for 20 BAF prisms. The verifiers request confirmation that the plot radius factor associated with 40 BAF (not 20) was applied in the field if/when needed. If the 40BAF factor was used, please update the Astoria Carbon SOP document as appropriate to be consistent with the prism used.			Astoria Carbon Cruise_SOPs_09Sept2019.docx Astoria_liveTreeCalcs1-7-20_daf.xlsx
			18 August 2020 Findings The PP has confirmed a 40 BAF prism was used during the 2019 inventory. Verifiers acknowledge the PP has revised the SOPs for the 2019 cruise to reflect the use of the 40 BAF prism and the application of the associated plot			Astoria Carbon Cruise SOPs_09Sept2019_Rev11Aug2020

		radius factor (1.333) in checking for borderline trees. This issue is now closed.	Astoria Carbon Cruise SOPs_09Sept2019_Rev11Aug2020
OPO/APD Response			
Date	PP Comment	Additional evidence submitted for review by PP	
11-Aug-20	<p>The SOPs were updated to replace the example calculation for borderline trees with a 40 BAF versus a 20 BAF. PP confirms that all variable radius plots used a BAF of 40.</p> <p>PP includes a redline version of the updated SOPs for review convenience in the shared Dropbox folder: Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > Inventory > SOPs</p>	Astoria Carbon Cruise SOPs_09Sept2019_Rev11Aug2020	

Verifier Issue	Issue ID:	20-2	Status: Closed	Checked by:	CL/BS	Date Identified	8-Jul-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description			Comments	
ACR IFM Methodology, v1.1, section C3.1.1	Inventory data workbook	Clarification. May impact OMM or conformance.	The PP’s plot and tree data workbook suggests there are three more plots in stratum CH (and three fewer in stratum CL) than do the sampling plan, sampling map, and carbon calculation workbook, among most other documents. The verifiers request confirmation of each plot’s strata assignment and an updated version of whichever document(s) is/are inaccurate.			Astoria_Plot_Tree_Data_Dec2019.xlsx Astoria sample design June2019.docx AstoriaInventoryDesignMap.pdf Astoria_liveTreeCalcs1-7-20_daf.xlsx	
			18 August 2020 Findings The PP notes the plot strata discrepancies between the CH and CL strata have been corrected in the revised <i>Plot Tree Data</i> workbook and the plot strata are now consistent with the other project documents. Verifiers concur the total plots for the CH and CL strata within the revised plot tree data worksheet now agrees with the total plots for these strata provided in the other project documents (revised live tree calcs, sampling plan and map). From the revisions completed in the revised plot tree data, verifiers note three plots in CH stratum (62, 70 and 71) were switched to the CL stratum. Verifiers can confirm, based on reviewing the 2013 average basal area within the stands associated with these plots, supporting the appropriate strata classification for the conifer dominated stands (all less than 250 ft2/ac). This issue is now closed.			Astoria_Plot_Tree_Data_Dec2019_rev_11Aug2020.xlsx Astoria_Plot_Tree_Data_Dec2019.xlsx Astoria sample design June2019 AstoriaCruiseData MBG_Astoria Invnetary Report_AppC Stands_Astoria_01232014.shp Astoria_InventoryMap.shp	
OPO/APD Response							

Date	PP Comment	Additional evidence submitted for review by PP
11-Aug-20	The <i>Astoria_Plot_Tree_Data_Dec2019</i> was an internal workbook used by the PP to evaluate and select a list of plots to be checked cruised. This workbook was corrected to state the correct plot strata to be consistent with the sampling plan, sampling map, and carbon calculation workbook, among most other documents. The revised document is in the shared Dropbox folder: <i>Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > Inventory Data > Astoria_Plot_Tree_Data_Dec2019_rev_11Aug2020.xlsx</i>	<i>Astoria_Plot_Tree_Data_Dec2019_rev_11Aug2020.xlsx</i>

Verifier Issue	Issue ID:	20-3	Status: Closed	Checked by:	CL/BS	Date Identified	26-Mar-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description				Comments
ACR IFM Methodology, v1.1, section C3.1.1	Inventory calculation workbook	Possible non conformance. May impact OMM or conformance.	During the July 14, 2020 model review call, verifiers noted the plot and tree data workbook as well as the tree counts in the inventory calculation workbook indicate multiple walk-through plots and several trees therein that were tallied twice. For Plot 109, verifiers request clarification on whether the two double counted walk-through trees noted in the inventory data were included in the plot-level carbon calculations.				Astoria_Plot_Tree_Data_Dec2019.xlsx Astoria_liveTreeCalcs1-7-20_daf.xlsx
			<u>20 July 2020 Findings</u> Verifiers understand the PP do not plan to correct this error as it has minimal effect on the total carbon stocks (small trees in the regeneration stratum). On July 19, 2020, we have discussed internally with S&A and with ACR; as long as the correctable error is less than 1% and the materiality threshold is less than 5% than there is no requirement to correct. We concur with the PP that the error (not including the two double counted trees) results in a slight under-estimate of carbon stocks that has minimal effect on the total carbon stocks (<1%). While we anticipate this error will not cause the materiality threshold to exceed 5%, we have not completed our review and the subsequent calculation of materiality yet; this issue will remain open until the verifiers finished the review and determined the project’s materiality.				
			<u>24 September 2020 Findings</u> Verifiers have completed the project review. The noted error above regarding the two double counted trees for plot 109 does not cause the materiality threshold to exceed 5%. This issue is now considered closed.				
OPO/APD Response							
Date	PP Comment					Additional evidence submitted for review by PP	
15-Jul-20	E-mail from David Ford:						

"Greg and I looked into plot 109. Caitlin is correct - two trees in the plot (walk-through) should have been included twice in the FVS tree list but were not. This is an error on our part. This is a regeneration unit and the two trees are small in diameter and will have only a minimal effect on total carbon (not including them reduces our overall carbon stocks reported). We do not plan to correct this unless we are required to re-run the FVS runs for other reasons resulting from your audit findings. Is this approach satisfactory to you?"

Verifier Issue	Issue ID:	20-4	Status:	Closed	Checked by:	CL	Date Identified	8-Jul-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description				Comments	
ACR IFM Methodology, v1.1, section C3.1.1	Inventory calculation workbook	New information request. May impact conformance; no impact on OMM	In response to a prior verifier request for plot-level TPA and BA values, the PP's submitted a revised inventory workbook that includes these requested values. However, the carbon calculations at both the tree and plot levels (as well as the summary statistics) in the revised version do not match the carbon calculations in the prior version. The verifiers request a single workbook with updated and accurate metrics (incl. TPA, BA, carbon) at both the tree level and the plot level.				Astoria_liveTreeCalcs1-7-20_daf.xlsx Astoria_liveTreeCalcs1-7-20glbg.xlsx	
			<u>18 August 2020</u> The PP has revised the Astoria_liveTreeCalcs workbook that now includes the accurate metrics for TPA, BA, and carbon at both the tree level and the plot level. This issue is now closed.				Astoria_liveTreeCalcs_Rev_F_13Aug2020.xlsx	
OPO/APD Response								
Date	PP Comment					Additional evidence submitted for review by PP		
13-Aug-20	PP revised the Astoria_liveTreeCalcs workbook to include accurate metrics for TPA, BA, and carbon at both the tree level and the plot level. The revised document is in the shared Dropbox folder: Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > Astoria_liveTreeCalcs_Rev_F_13Aug2020.xlsx					Astoria_liveTreeCalcs_Rev_F_13Aug2020.xlsx		

Verifier Issue	Issue ID:	20-5	Status:	Closed	Checked by:	CL/BS	Date Identified	9-Jul-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description				Comments	
ACR IFM Methodology,	ERT calculation workbook	Possible non conformance.	The PP's describe corrections they made to RP1 stocks (namely, adding second growth cycle between initial inventory and RP1, and adding not subtracting HWP carbon in RP1). These corrections are indicated in the ERT workbook, alongside the				Astoria_RP2_Modeling.docx Appendix A_ACR_ERT worksheet_RP2_25May2020.xlsx	

v1.1, equations 3&5.		<i>May impact OMM or conformance.</i>	uncorrected metrics. Despite the PP's written description, how the corrections are folded into the uncorrected metrics still remains fairly opaque. The verifiers request further clarification, including a worksheet that includes only the final, corrected numbers.	
			<p><u>23 July 2020 Findings</u> Verifiers acknowledge receipt of explanation document and revised RP2 worksheet. As discussed on July 22, 2020 during our phone call, before continuing our review of the RP2 documents we'd like to get clarification from ACR on the RP1 change and implications, if any, on RP2.</p> <p>We have asked for guidance from ACR on two items: (1) If error in RP1 results in an ERT discrepancy of less than 5% does this imply no corrections are needed in RP1? (verifiers estimated ~0.5% difference between ERT RP1 old and ERT revised); and (2) given the error in RP1, what is the appropriate way to incorporate this change moving forward in calculation of ERTs for RP2?</p>	<p><i>Explanation of Project Accounting Correction_21July2020</i></p> <p><i>Appendix A_ACR_ERT worksheet_RP2_Revised)21July2020</i></p>
			<p><u>24 July 2020</u> Verifiers received the following clarifications from ACR (A. Taylor):</p> <p>(1) Regarding ERT discrepancy in RP1 - As the RP1 over-issuance was immaterial, ACR won't be requiring any direct payback or change to RP1's ERT issuance.</p> <p>(2) Regarding project accounting going forward - ACR would like to see the project correct their accounting, including making corrections to the worksheet for RP1. This would be using the spreadsheet where you corrected RP1 that resulted in ERT of 139,868 tCO₂e at end of RP2 (ACR_ERT worksheet_RP2_if corrected version_25May2020). They believe this is more accurate and more conservative.</p> <p>Given this input, please provide a revised ERT workbook for RP2, similar to the corrected version, and we will continue on with our verification for RP2. The previous worksheet with supporting information on RP1 error and correction (Appendix A_ACR_ERT worksheet_RP2_Revised)21July2020) along with the summary description will still be part of the verification (background info for RP1 correction).</p>	
			<p><u>27 July 2020</u> Verifiers received and reviewed the revised RP2 ERT worksheet and followed up with a conference call with the PP to discuss options to address the appropriate method to account for the discrepancy in RP1. Upon reviewing the standards, verifiers were not able reach clarity on the appropriate method to address this change for RP2. Verifiers suggested that the PP seek guidance directly from ACR to resolve.</p>	<i>ACR_ERT worksheet_RP2_26Jul2020</i>
			<p><u>30 July 2020</u> On July 29 & 30, 2020, the PP and verifiers received guidance back from ACR (A.Taylor) that included:</p>	<i>Astoria_ACR_ERT worksheet_RP2_27Jul2020</i>

		<p><i>“As the RP1 over-issuance of 1260 ERTs is below ACR’s materiality threshold of 5%, we will not require any correction or compensation at this time.</i></p> <p><i>We ask that details about the quantification of the RP1 over-issuance are reported in the RP2 Monitoring Report. There’s not a perfect spot for reporting this type of issue in the Monitoring Report template as is, but you can provide these details in the section IV.1. Reversals (and note that this was not an actual reversal). We also ask that the over-issuance is verified to be under the materiality threshold.”</i></p> <p>Verifiers and the PP understand that the appropriate worksheet to use for the RP2 verification is <i>Astoria_ACR_no_RP1_correction</i> (RP2 issuance the PP is seeking and the VB is verifying is for 142,327 tCO2e).</p> <p>Verifiers have estimated the over-issuance for RP1 is approximately 0.5% and is under the 5% materiality threshold. The supporting documentation and calculation are provided in the verifiers data check log.</p> <p>This issue will remain open until the PP has revised the RP2 Monitoring Report to include details about the quantification of the RP1 over-issuance. The ERTs also need to be revised.</p>	
		<p>18 August 2020 Findings</p> <p>The PP has revised the RP2 Monitoring Report to include details about the quantification of the RP1 over-issuance in Section IV.1 (14Aug2020 report). The ERT worksheet has also be revised to clarify the ERTs reported in RP1 and corrected the ERTs reported in RP2. Verifiers concur with these changes. The issue is now considered closed.</p>	<p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 2_14Aug2020</i></p> <p><i>Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_rev10Aug2020</i></p>
OPO/APD Response			
Date	PP Comment	Additional evidence submitted for review by PP	
21-Jul-20	<p>e-mail from David Ford:</p> <p><i>“Attached are two documents:</i></p> <p><i>1) A Word document that provides an explanation of the corrections we made to the ERT Worksheet to correct RP1 errors not conforming to the methodology.</i></p> <p><i>2) A revised Excel workbook we propose to be used for RP2 verification purposes. The Astoria_ACR worksheet is a combination of the previous two worksheets we reviewed yesterday. From the project start date through the end of RP2, we propose to use the initial worksheet format which includes the revisions in Column F - this will provide transparency of the errors and corrections for future verifications.</i></p>	<p><i>Explanation of Project Accounting Correction_21July2020</i></p> <p><i>Appendix A_ACR_ERT worksheet_RP2_Revised)21July2020</i></p>	

	Beginning with RP3, we will use a modified layout that shows harvest in a column between each project year (i.e the picket fence analogy we discussed on our modeling call last week) .”	
26-Jul-20	<p>e-mail from David Ford:</p> <p><i>“So as I understand correctly, ACR wants the accounting to be corrected. We agree that the accounting should correct - thus, conservatism is not relevant, as there is no need to be conservative if the accounting is correct.</i></p> <p><i>Attached is a new ERT workbook named ACR_ERT worksheet_RP2_26Jul2020.</i></p> <p><i>This workbook contains two Astoria_ACR worksheets.</i></p> <p><i>Astoria_ACR_corrected - This worksheet assumes that we correct the over crediting that occurred in RP1 - we were credited 1,260 more ERTs than if the accounting was done correctly. In cell J39 we increased the negative balance by the 1,260 ERTs to address the over issuance in RP1. The result is that the total Tradable Balance at the end of RP2 is 403,221 and the RP2 credit issuance is 141,067.</i></p> <p><i>Astoria_ACR_no correction - This worksheet assumes that the errors we made in RP1 are accepted by ACR and we move forward with correct accounting procedures as stated in the methodology beginning in RP2. In this case, this RP1 issuance remains 262,154. We account for growth and harvest through RP2 and the result is a Total Tradable Balance of 404,481 (this is 1,260 greater than if we correct for the errors in RP1) Thus, the issuance for RP2 would be 142,327.</i></p> <p><i>If ACR is okay with not correcting RP1 errors because the RP1 over-issuance was immaterial, then the Astoria_ACR_no correction worksheet should be used for RP2 verification. However, if they prefer that we make corrections to RP1, then the Astoria_ACR_corrected worksheet should be used for RP2 verification.</i></p> <p><i>Regarding the workbook that resulted in ERT of 139,868 tCO2e at end of RP2 (ACR_ERT worksheet_RP2_if corrected version_25May2020), this workbook was not correct as it did not properly recognize the "Verification Event" (row 45). The Total Tradeable Balance is the same at 403,221; however the Tradable Balance at the end of RP1 should have been 260,894. - see attached ACR_ERT worksheet_RP2_if corrected version_25May2020_Revised 26July2020.”</i></p>	ACR_ERT worksheet_RP2_26Jul2020
28-Jul-20	<p>David Ford sent the following e-mail to ACR</p> <p>The question for ACR is which accounting option should we move forward with?</p> <p>Option 1: Accept the RP1 credits as verified and issued - 262,154 and then apply the correct methodology equations during RP2 (see worksheet Astoria_ACR_no_RP1_correction; or</p> <p>Option 2: Correct the calculation errors made in RP1 and apply the correct methodology equations during RP2 (see worksheet Astoria_ACR_RP1_corrected).</p>	Astoria_ACR_ERT worksheet_RP2_27Jul2020

	There is a third worksheet that demonstrates the accounting if it was done accurately from the beginning of the project (see worksheet Astoria_ACR_Accurate_Accounting).	
14-Aug-2020	<p>The Monitoring Report for RP2 was revised to address ERT calculation errors in RP1 in Section IV. 1. Also, the ERTs were revised to the correct value of 142,327 in sections III.1 and VI.5.</p> <p>Further, the ERT worksheet tab that contains the ERT calculations was renamed: <i>Astoria RP2 ERTs_Final</i>.</p> <p>The revised MR document is in the shared Dropbox folder: <i>Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > Monitoring Report > Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 2_14Aug2020</i></p> <p>The revised ERT worksheet is in the shared Dropbox folder: <i>Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > Monitoring Report > Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_rev10Aug2020</i>.</p>	<p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 2_14Aug2020</i></p> <p><i>Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_rev10Aug2020</i></p>

<u>Verifier Issue</u>	<u>Issue ID:</u>	<u>20-6</u>	<u>Status:</u>	<u>Checked by:</u>	<u>CL/BS</u>	<u>Date Identified</u>	<u>10-Aug-20</u>
ACR Standard ref	GHG Plan Section	Significance	Issue Description				Comments
ACR Standard, v4.0, Chap 2; ACR Validation/Verification Standard V1.1, 9F	GHG Plan; MRs RP1 & RP2	Clarification. May impact OMM or conformance.	<p>There is a discrepancy of over 98,000 tonnes in carbon stocks between the modeled data for 2018 (based on initial 2013 inventory data) and the stocks computed from the 2019 re-inventory (~ 10% reduction). The verifiers are aware inventory methodologies changed between 2013 (non-permanent plots, 865 plots, no plots in roads or streams, timber cruise-type inventory) and 2019 (111 CFI plots, entire project areas, carbon-type inventory). Some degree of variability in stocks may therefore be anticipated, in addition to the inherent variability associated with modeled growth versus <i>in situ</i> growth. While this change is conservative in regards to project stocks, the baseline was computed from the 2013 inventory and will thereby propagate this discrepancy forward.</p> <p>Verifiers are seeking a) further explanation regarding this discrepancy, including any model calibration efforts to “true-up” the grown-ahead stocks with 2019 stocks (again, with the acknowledgement that the inventory methodology changed); and b) assurance that the baseline computed from the 2013 inventory data errs on the conservative side into the future with regards to ERTs that may be claimed.</p>				<p><i>Astoria_Initial Monitoring Report_01_01_2014-09_30_2015_FINAL</i></p> <p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 1_15May 2020</i></p> <p><i>Astoria_GHG Plan_FINAL</i></p> <p><i>Astoria_ACR_ERT worksheet_RP2_27Jul2020_Rev10Aug2020_bill</i></p>

		Also, verifiers acknowledge that the 2019 inventory efforts were aimed at meeting the project objectives of conducting a carbon-based inventory (rather than a timber-based inventory), which resulted in changes to the forest inventory method used in Reporting Period 1. How does this method change comply with the ACR Consistency accounting principle (Standard, Chap 2)? Did the PP consult with ACR prior to changing the inventory method used for Reporting Period 2?	
		<p><u>18 August 2020 Findings</u></p> <p>Upon further review and discussions (both with the PP and auditors), we recognize the 2013 inventory and the associated baseline developed were verified and validated during RP1; we understand these cannot be changed. In assessing the ACR Consistency accounting principle, we do not have issue with the methodology used in 2019 as it follows established methods to estimate project stocks in achieving the ACR statistical sampling requirements. Rather we were assessing how the change in the inventory methodologies, from 2013 to 2019, complies with this Consistency principle.</p> <p>We acknowledge applying the same 2013 inventory methodology was not possible for the 2019 re-inventory (e.g., lack of precision in relocating the 2013 plot centers) nor, as discussed with the PP, was it desired (800 plots to inventory). Verifiers believe the 2019 inventory method is of higher quality approach that reduces potential bias approach (tighter DBH tolerances and including the stream and roads into the sampling frame). More importantly, the 2019 inventory now establishes a long-term monitoring system for attain future project stock estimates in a more consistent manner. Lastly, the true-up of project stocks at the end of RP2 also resulted in conservative re-adjustment (i.e. reduction of project stocks of ~98,000 tCO₂e). For these reasons, we now considered this issue closed.</p>	
OPO/APD Response			
Date	PP Comment	Additional evidence submitted for review by PP	
14-Aug-20	<p>The inventory used for RP1 was completed before the City of Astoria decided to enroll in a forest carbon project. Thus, the inventory was a stand-based inventory to assess volume and value of each stand, not to assess carbon stocks within the project boundary. And as noted by the Verification team, it was not installed as a permanent plot system and could not be replicated at the end of RP2.</p> <p>The City of Astoria decided to establish a continuous forest inventory system that was compatible with the requirement of its ACR forest carbon project. Thus, a new carbon inventory was designed by TerraCarbon LLC to establish permanent plot locations and to achieve the required ACR statistical sampling requirement. The inventory design follows well established and accepted methods for estimating carbon stocks within a project area. Note: TerraCarbon LLC has designed more than half of the existing ACR IFM projects registered using a similar inventory design process for this project as employed by many other ACR registered and active IFM projects.</p>		

The new inventory implemented in November 2019 (well after the 2019 tree growing period ended) resulted in the statistical outcome of total project uncertainty (using equation 19) of $\pm 8.58\%$ with a 90% confidence interval. When the UNC in equation 19 is $<10\%$, then UNC shall be considered 0% in equation 20 – meaning than no uncertainty deduction is required to be applied in calculated ERTs.

Since the new inventory was completed at the end of RP2, there was no attempt or need to calibrate the modeling to attempt a “true-up” of the grown-ahead stocks with 2019 inventoried stocks. The stock estimates calculated from the 2019 inventory are a valid statistical representation of the carbon in live trees within the project area.

The Verifier team seeks assurance that the baseline computed from the 2013 inventory data errors on the conservative side into the future with regards to ERTs that may be claimed. The baseline was validated in RP1 and fixed over the initial 20-year crediting period. Based on the new inventory, the Project Proponent estimates that over the 20-year crediting period approximately 17,624 less ERTs will be issued for this project as compared to the ERT estimate based on the initial inventory (495,433 versus 477,809 ERTs) – see RP1 and RP2 ERT worksheets.

The inventory methods for RP1 and RP2 comply with the ACR Consistency accounting principle (Standard, Chap 2) because both inventory designs followed well established and accepted methods for estimating tree volume/carbon stocks within a project area and they both meet the ACR project uncertainty requirements. The Project Proponent did not consult with ACR prior to changing the inventory method used for Reporting Period 2 as it was not possible to relocate the original inventory plots due to the temporary nature of that inventory (no permanent plot centers and no marking on the inventory trees). The Project Proponent followed the ACR Standard and methodology requirements in designing and implementing the 2019 inventory.

Verifier Issue	Issue ID:	20-7	Status: Closed	Checked by: BS	Date Identified	3-Jul-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description		Comments	
ACR IFM Methodology, v1.1, section D1	Appendix J	New information request. <i>May impact OMM or conformance.</i>	Verifiers are reviewing the project’s spatial data and working with the following file from the RP1 folder: <i>Stands_Astoria_01232014.shp</i> . The forest typing listed in the attribute table shows a conifer type, which we assume is the two conifer strata (Hi & Low) lumped together. Is there a spatial data set available providing strata as an attribute?		<i>Stands_Astoria_01232014.shp</i>	
			8 July 2020 Findings The PP has provided the requested strata spatial data files. The verifiers had also requested clarification on the 2019 stratification process for the conifer strata, which was addressed and resolved in another issue (20-15). As the requested spatial data		<i>Astoria_InventoryMap.shp</i>	

		was provided, found to be correct and the stratification process subsequently clarified, this issue is now closed.	
OPO/APD Response			
Date	PP Comment	Additional evidence submitted for review by PP	
8-Jul-20	<p>e-mail from David Ford:</p> <p><i>"Please find attached a shape file (zip file) that contains the information you requested. The attached shapefile contains the boundaries of the four strata that were used as the basis of a new inventory design and re-inventory at the end of RP2. I apologize for the confusion, as it appears I did not provide this new shape file as part of the files available in our shared Dropbox folder for RP2 and you were using the original shapefile from RP1. The new Astoria_InventoryMap.shp is also now available on the shared Dropbox folder - see Inventory folder under RP2 Docs - here is a link for your convenience - https://www.dropbox.com/sh/nhb2uevqh0evqud/AADBb5pp5F4Pdp10ZLPGTK2Ha?dl=0."</i></p>	Astoria_InventoryMap.shp	

Verifier Issue	Issue ID:	20-8	Status: Closed	Checked by: BS	Date Identified	6-Aug-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description		Comments	
ACR Forest Carbon Project Standard, section 8.A		Non conformance. <i>May impact conformance; no impact on OMM</i>	<p>The ACR Carbon Standard requires that each year, the Project Proponent shall submit a signed Attestation that:</p> <ul style="list-style-type: none"> • Confirms the continuance of project activities; • Confirms that ownership remains clear and uncontested; • Discloses any negative environmental or community impacts or claims of negative environmental and community impacts, and documents plans to mitigate any reported negative environmental or community impacts; • Addresses any significant change in external conditions that would affect the quality or environmental integrity of the project. <p>An Attestation signed by the PP applicable to this monitoring period fulfilling these requirements has not been provided.</p>			
			<p>18 August 2020 Findings</p> <p>Verifiers agree with the PP that ACR's Monitoring Report (v2), serves as the required regulatory compliance attestation. We acknowledge the revised RP2 Monitoring Report (Section III.4) includes the needed PP's attestations confirming (1) the continuance of project activities; and (2) that ownership remains clear and uncontested.</p>		<p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 2_14Aug2020</i></p> <p><i>Annual ACR Attestation 2019 - Signed Jan2020</i></p>	

		<p>The PP has provided the signed Annual ACR Attestations for all of the vintage years during the reporting period, which includes confirmation of the PP's attestation to (1) to disclose any negative environmental or community impacts or claims of negative environmental and community impacts, and documents plans to mitigate any reported negative environmental or community impacts; and (2) to address any significant change in external conditions that would affect the quality or environmental integrity of the project.</p> <p>With these submittals and associated MR attestations, the Project now complies with the Standard and this issue is considered closed.</p>	<p><i>Astoria_ACR Attestation 2017 - signed</i></p> <p><i>Jan2018Annual ACR Attestation 2016 – Signed</i></p> <p><i>Astoria_ACR Attestation 2018 - Signed</i></p>
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OPO/APD Response

Date	PP Comment	Additional evidence submitted for review by PP
14-Aug-20	<p>The American Carbon Registry Monitoring Report, Version 2 now serves as the required regulatory compliance attestation. This Monitoring Report (MR) version requires the Project Proponent to sign the MR meeting the attestation requirement – see Section III.4. – Regulatory Compliance – which now includes:</p> <ul style="list-style-type: none"> • Confirms the continuance of project activities; and • Confirms that ownership remains clear and uncontested. <p>Also, ACR requires the Project Proponent to submit an annual signed ACR Voluntary Offset Project Attestation. This annual attestation addresses:</p> <ul style="list-style-type: none"> • Discloses any negative environmental or community impacts or claims of negative environmental and community impacts, and documents plans to mitigate any reported negative environmental or community impacts – see item 6; • Addresses any significant change in external conditions that would affect the quality or environmental integrity of the project – see item 7. <p>A copy of all the ACR Voluntary Offset Project Attestations are available on the shared Dropbox project folder: <i>Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > Attestations.</i></p>	<p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 2_14Aug2020</i></p> <p><i>Annual ACR Attestation 2019 - Signed Jan2020</i></p> <p><i>Annual ACR Attestation 2016 – Signed</i></p> <p><i>Astoria_ACR Attestation 2017 - signed Jan2018</i></p> <p><i>Astoria_ACR Attestation 2018 - Signed</i></p>

Verifier Issue	Issue ID:	20-9	Status: Closed	Checked by:	BS/EM	Date Identified	10-Jun-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description	Comments			

ACR IFM Methodology, v1.1, section D2 & D5	MR Section V.2; ERT calculation workbook	New information request. <i>May impact OMM or conformance.</i>	Verifiers are reviewing harvested wood product calculations and assessing the PP's monitoring system for harvesting. Please provide: (1) 2018 harvesting records (trip tickets, dates, product type, species, scaled volumes, mill destination, logging contractor); and (2) 2018 timber sale spatial data (timber sale name, units, acreages, silvicultural prescriptions).	<i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 1_15May 2020</i>
			<p><u>3 September 2020 Findings</u></p> <p>The PP has provided the requested 2018 harvest records. After reviewing the documents verifiers had some clarifications on the PP's methods in estimating long term carbon storage in harvested wood products (HWP) based on annual harvesting records; a follow-up conference call with David Ford and Greg Latta was conducted on August 19, 2020. Verifiers understand the PP determines long term carbon storage of HWP by modeling the annual harvest acreage (<i>Annual Harvest 2014-2019</i>) in FVS with specified keywords based to match the harvest volume for each year, which is summarized in the GHG Plan. The PP applies the default wood product percentages for the region.</p> <p>There is a discrepancy in the 2018 total harvest acreage between the GIS timber sale shape files and the values provided in the <i>Astoria ACR Annual Harvest 2014-2019</i> workbook (tabs: "BCW Harvest Summary" and "RP2 2017-2019 Harvest"). This discrepancy is also shown when comparing the harvest units depicted in the GIS timber sale shape files with the units in the bid packet harvest layout map (<i>2_25_2018harvestlayout.pdf</i>). Please clarify and revise project documents as needed and appropriate.</p> <p>Please correct the typo in the harvest volume units shown in the "Harvest" tab (row 5) within the <i>Reports Spur1 Combo Timber Sale 2018 (final)</i> workbook (MBF vs BF).</p> <p>The gams model was used to apply the area harvested each year. Verifiers have been able to confirm most of the code on lines 454 to 502 in the <i>AstoriaProject_2019.gms</i> file with the values provided in the <i>Annual Harvest</i> workbook but have the following questions:</p> <ol style="list-style-type: none"> 1. Line 483 applies a thinning of 3.2 acres in 2016 to stand 112. The Annual Harvests workbook indicates that the actual thinned area of stand 112 in 2016 is 18.9 acres. Please clarify this discrepancy. 1. 2. The source of the acreage clearcut in stand 90 has not been provided. The "RP2 2016 Harvest" tab in the <i>Annual Harvest</i> workbook provides volume harvested but not the acreage. Please clarify how the amount of area clearcut in stand 90 was determined 	<p><i>Astoria_ACR_Annual Harvest 2014-2019</i></p> <p><i>SPUR1_bidpacket</i> (folder) – contains timber sale information for 2018. <i>2_25_2018harvestlayout.pdf</i></p> <p><i>harvestinfo.zip</i> – contains GIS files for 2018 timber sale</p> <p><i>REPORTS SPUR 1 COMBO TIMBER SALE 2018 (final).xls</i></p> <p><i>samplesettlement.pdf</i></p> <p><i>Astoria_GHG Plan_FINAL.pdf</i></p> <p><i>AstoriaProject_2019.gms</i></p>

			<p>9 September 2020 Findings</p> <p>The PP has provided clarification for the 2018 harvest acreage discrepancy between the area calculated with GIS shape files and the reported value noted in the <i>Astoria ACR Annual Harvest 2014-2019</i> workbook (tabs: “BCW Harvest Summary” and “RP2 2017-2019 Harvest”). Verifiers understand the previously submitted GIS files were not correct due to a software upgrade conversion issue. The PP has provided the correct GIS 2018 timber sale shape files (<i>FinalUnits2018.zip</i>) and has calculated 53.17 acres as the final total harvest area is version. Verifiers confirmed the same value in our acreage check of these updated GIS shape files.</p> <p>The PP has revised the <i>Astoria ACR Annual Harvest 2014</i> workbook with the correct harvest acres and revised the modeling by changing the following:</p> <ul style="list-style-type: none"> • Stand 4 thinning acres changed from 9.28 acres to 9.534543 acres • Stand 4 clearcut acres changed from 4.8 acres to 4.641657 acres • Stand 21 thinning acres changed from 12.53037728 acres to 12.626702 acres • Stand 12 clearcut acres changed from 11.5 acres to 11.031141 acres • Stand 13 thinning acres changed from 10.6 acres to 10.955893 acres • Stand 18 clearcut acres changed from 3.9 acres to 4.375136 acres. <p>Verifiers can confirm these stand acreages were changed in the model inputs.</p> <p>The PP has corrected the typo in the harvest volume units shown in the “Harvest” tab (row 5) within the revised <i>Reports Spur1 Combo Timber Sale 2018 (final)</i> workbook (corrected to BF).</p> <p>Verifiers have confirmed the thinning applied to Stand 112 uses the correct acreage and are satisfied with the explanation provided for the treatment area calculated for Stand 90.</p> <p>Verifiers have one additional question in the reviewing of the revised gams model. Stand_ID 21 is listed as both Stand 7 and Stand 21 in the gams model (lines 465 and 479). A thinning is applied to Stand_ID 21 in 2014 of 45 acres, and a thinning of 45 acres is also applied to Stand_ID 59 that same year. Verifiers have been able to confirm the thinning in Stand_59 from the Annual Harvests workbook provided, but need clarity on the following two items:</p> <ol style="list-style-type: none"> 1. Where the 45-acre thinning in Stand_ID 21 is documented; and 2. How Stand_ID 21 can be listed as both stand 7 and stand 21 in the gams model. 	<p><i>FinalUnits2018.zip</i></p> <p><i>Astoria_ACR_Annual Harvest 2014-2019_4Sep2020</i></p> <p><i>REPORTS SPUR 1 COMBO TIMBER SALE 2018 (final)_Rev_06Sept2020.xls</i></p> <p><i>AstoriaProject_2019.gms</i></p> <p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 3_06Sept2020</i></p> <p><i>Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_Rev_06Sept2020</i></p>
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		<p>22 September 2020 Findings</p> <p>Verifiers understand there was no thinning of 45 acres in Stand_ID 21; the lines of code for the gams model we noted were not execution lines (marked with asterisk) and were from previous model runs. We also understand the line of code stating “*stand 21 is our stand ID 21” was an erroneous comment line, which was a remnant from previous runs as well, and Stand 7 was the original 2013 inventory stand number that was referred to as Stand ID 21.</p> <p>The PP has provided the requested clarifications. This issue is now closed.</p>	<i>AstoriaProject_2019_09132020.gms</i>
OPO/APD Response			
Date	PP Comment	Additional evidence submitted for review by PP	
14-Aug-20	<p>Information about the 2018 timber sale (only timber sale conducted in 2018) may be found in the folder <i>SPUR1_bidpacket</i> on the shared Dropbox folder: <i>Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > 2018 Harvest Information > SPUR1_bidpacket</i>.</p> <p>The 2018 harvesting records (trip ticket summary, dates, product type (sawlog/pulp), species, scaled volumes/net tons and MBF equivalent, mill destination, logging contractor (Hampton)) are included in the <i>Astoria REPORTS SPUR 1 COMBO TIMBER SALE 2018 (final).xls</i>. Astoria personnel do not keep/store individual load tickets once they are verified through the Contractor Settlement Reports – see <i>samplesettlement.pdf</i>. These files are on the shared Dropbox folder: <i>Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > 2018 Harvest Information</i>.</p> <p>The 2018 spatial data may be found on the shared Dropbox folder: <i>Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > 2018 Harvest Information > samplesettlement.pdf</i>.</p> <p>06-Sept-20</p> <p>1) The discrepancy in the 2018 total harvest acreage between the GIS timber sale shape files and the values provided in the <i>Astoria ACR Annual Harvest 2014-2019</i> workbook was due to an error in the GIS timber sale shapefile provided to you as a result in converting the files to an upgraded GIS software version. The correct GIS timber shape file for the 2018 harvest is available at the shared Dropbox folder – see the file <i>FinalUnits2018.zip</i> in the <i>2018 Harvest Information</i> folder.</p> <p>The total acres harvested in 2018 were 53.17. The modeling was revised to use the revised acres harvested in 2018 to match the GIS shapefile acres.</p> <p>2) The typo in the harvest volume units shown in the “Harvest” tab (row 5) within the <i>Reports Spur1 Combo Timber Sale 2018 (final)_Rev_06Sept2020</i> workbook has been corrected to state BF.</p> <p>3) Stand 112 -- The gams model used to apply the area harvested each year was corrected for the 2016 harvest thinning in stand 112 from 3.2 acres to 18.9 acres.</p>	<p><i>SPUR1_bidpacket</i> (folder) – contains timber sale information for 2018.</p> <p><i>harvestinfo.zip</i> – contains GIS files for 2018 timber sale</p> <p><i>REPORTS SPUR 1 COMBO TIMBER SALE 2018 (final).xls</i></p> <p><i>samplesettlement.pdf</i></p> <p><i>FinalUnits2018.zip</i></p> <p><i>Astoria_ACR_Annual Harvest 2014-2019_4Sep2020</i></p> <p><i>REPORTS SPUR 1 COMBO TIMBER SALE 2018 (final)_Rev_06Sept2020.xls</i></p> <p><i>AstoriaProject_2019.gms</i></p>	

<p>4) Stand 90 -- The previous Astoria forester (retired) did not provide us the total number of acres harvested in stand. Thus, we used the total volume harvested and divided that by the average volume per acre for the stratum to estimate the number of acres that were harvested. We used that acre estimate in the modeling, as that was the best information available to complete our modeling.</p> <p>5) 2018 harvest acres – we revised the acres used in the model to match the harvest GIS layer acres – now 53.17 acres harvested.</p> <ul style="list-style-type: none">• Stand 4 thinning acres changed from 9.28 acres to 9.534543 acres• Stand 4 clearcut acres changed from 4.8 acres to 4.641657 acres• Stand 21 thinning acres changed from 12.53037728 acres to 12.626702 acres• Stand 12 clearcut acres changed from 11.5 acres to 11.031141 acres• Stand 13 thinning acres changed from 10.6 acres to 10.955893 acres• Stand 18 clearcut acres changed from 3.9 acres to 4.375136 acres. <p>6) In reviewing the NPV model code we also noticed an error incorrectly attributing the 10 acres thinned in 2019 to 2018 which was also corrected.</p> <p>These revisions are incorporated into the Monitoring Report and the ERT workbook.</p> <p>15 September 2020 Response</p> <ol style="list-style-type: none">2. S&A Comment (1) - Where the 45-acre thinning in Stand_ID 21 is documented?3.4. Response - There was no thinning of 45 acres in Stand_ID 21. The lines of code you are referring to start with an asterisk (*) – this means these are comment lines not execution lines. These lines were a remnant from previous runs.5.6. S&A Comment (2) How Stand_ID 21 can be listed as both stand 7 and stand 21 in the gams model.7.8. Response - The line of code stating “*stand 21 is our stand ID 21” was an erroneous comment lines that was a remnant from previous runs.9. Stand 7 was the original MB&G stand number and we refer to it as Stand ID 21.10.11. A revised <i>AstoriaProject_2019_09132020.gms</i> file that deletes comment lines 479, 480, and 481 is available on the shared Dropbox for your review.	<p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 3_06Sept2020</i></p> <p><i>Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_Rev_06Sept2020</i></p> <p><i>AstoriaProject_2019_09132020.gms</i></p>
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<u>Verifier Issue</u>	<u>Issue ID:</u>	<u>20-10</u>	<u>Status:</u> Closed	<u>Checked by:</u>	BS	<u>Date Identified</u>	10-Jun-20
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ACR Standard ref	GHG Plan Section	Significance	Issue Description	Comments
ACR IFM Methodology, v1.1, section D3	MR Sections: III.5 & V.2	New information request. <i>May impact conformance; no impact on OMM</i>	Verifiers request: (1) the most current Forest Management plan and (2) a copy of the FSC certification for sustainable management.	<i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 1_15May 2020</i>
			19 August 2020 Findings The PP has provided the requested Forest Management plan and a copy of the FSC certification. Review of this information was found to be sufficient and accurate and provided the supporting documentation to justify potential activity shifting leakage as de minimis. This issue is now closed.	<i>forest management plan 2014.pdf</i> <i>FSC Certification 1.7.2020.pdf</i>
OPO/APD Response				
Date	PP Comment			Additional evidence submitted for review by PP
11-Aug-20	PP has uploaded the current Forest Resource Management Plan and the latest FSC Certification document in the shared Dropbox folder – see <i>Forest Management Plan – FSC Cert</i> folder. Note: The project Proponent is currently updating its Bear Creek Watershed Forest Resource Management Plan and this work is estimated to be completed by the end of 2020. These documents are in the shared Dropbox folder: <i>Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > Forest Management Plan - FSC Cert</i>			<i>forest management plan 2014.pdf</i> <i>FSC Certification 1.7.2020.pdf</i>

Verifier Issue	Issue ID:	20-11	Status: Closed	Checked by: BS	Date Identified	4-Aug-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description		Comments	
ACR Standard v4, Chapter 3 (pg19)	MR Section III.4	Non conformance. <i>May impact conformance; no impact on OMM</i>	Please provide a copy for the regulatory compliance attestation for this monitoring period.			
			19 August 2020 Findings Verifiers concur that ACR's Monitoring Report (v2) now serves as the required regulatory compliance attestation. The updated monitoring report provides the supporting regulatory compliance summary (Section III.4) along with the PP's signature. On August 10, 2020, verifiers confirmed this attestation by checking with Ashley Latora, the Stewardship Forester, with the Oregon Department of Forestry (Astoria District) who monitors the PP's project area; during the reporting period, the project's activities met all material regulatory requirements as specified in the Oregon Forest Practices Act and the Oregon Department of Forestry Forest Practice		<i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 2_14Aug2020</i>	

		Administrative Rules - No violations of the Oregon Forest Practices Act or the Oregon Department of Forestry Forest Practice Administrative Rules were recorded. This issue is now closed.	
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OPO/APD Response

Date	PP Comment	Additional evidence submitted for review by PP
14-Aug-20	The American Carbon Registry Monitoring Report, Version 2 now serves as the required regulatory compliance attestation. This Monitoring Report version requires the Project Proponent to sign the document meeting the attestation requirement.	Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 2_14Aug2020

Verifier Issue	Issue ID:	20-12	Status: Closed	Checked by: BS	Date Identified	4-Aug-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description			Comments
ACR IFM Methodology, v1.1, section F1	Carbon Cruise SOP	New information request. May impact conformance; no impact on OMM	<p>As noted in the PP's Carbon Cruise SOPs document, the QA/QC inventory data collection procedures included check cruising that was conducted throughout the duration of the project field data collection process to ensure accurate and efficient data are collected. Verifiers understand there were measurement specifications and tolerances applied to plots that were checked cruised.</p> <p>If prepared, verifiers request a copy of the inventory check cruise report. If no report was completed, verifiers request a summary of the check cruise results. In both cases, verifiers are requesting summary results addressing, at a minimum, the following: dates of the check cruise; who completed; total number of plots checked; number of cruisers assessed; number of errors/plot failures recorded; and summary of follow-up items and data collection implications.</p>			Astoria Carbon Cruise SOPs_09Sept2019
			<p>20 August 2020 Findings</p> <p>The PP has provided the request information. Verifiers understand a check cruising report was not completed. Six plots were checked cruised on November 16, 2019 (~5% of the 111 plots). Two cruisers installed and measured the 111 plots within the project area (3 plots of each cruiser were checked cruised). Results of the check cruise indicated all measurements were within the tolerances specified in the Carbon Cruise SOP. There were no failed plots and no follow-up items that needed to be addressed. Verifiers understand the PP has worked with the cruising contractor previously; they were well qualified and experienced (also confirmed during the July 2020 site visit). After the inventory data was submitted the PP completed QA/QC on the data set. Verifiers are satisfied with the PP's descriptive summary of the inventory QA/QC process; this issue is now closed.</p>			Astoria Carbon Cruise SOPs_09Sept2019

OPO/APD Response

Date	PP Comment	Additional evidence submitted for review by PP
14-Aug-20	<p>Pre-Field Training - Prior to the contractor (Cougar Environmental) initiating the inventory, David Ford conducted a training session via conference call with the supervisor and two field personnel selected to install the permanent plots and collect the required data as specified in the SOPs. David Ford has conducted multiple trainings with the contractor using similar SOPs on other ACR IFM carbon projects, so the contractor was familiar with the SOPs and has successfully completed multiple carbon inventories over the past several years.</p> <p>Check Cruising – Ben Hayes, Astoria City forester conducted the check cruise on November 16, 2019. The contractor crew was on site and Ben visited each of the two crew members on an inventory plot (plots 44 and 6). In addition 4 additional plots were checked (plots 5, 65, 96 and 97). All plots used BAF 40 and were randomly selected from the initial 48 plots completed the prior week with 3 plots from each cruiser. Plot cards from the check cruising were compared in the field with measured data. Data for species was 100% correct and diameter and height were well within specified tolerances. No borderline trees were missed or mistakenly included. Markings on trees, plot centers, and notes were properly notated and met the SOP requirements. One walkthrough plot was cruised and all data correctly tallied. Plot cards were not retained after this check cruise. Based on the results of the check cruise, there were no follow-up items for the contractor to address and it was determined that no additional plots would be checked.</p> <p>Data QA/QC - The contractor submitted inventory data in two separate batches. David Ford and David Shoch (TerraCarbon LLC) completed a QA/QC check on all data submitted to ensure that were no data values were out of the expected range. The final data set was used for calculating the live tree carbon stocks and the inventory statistics.</p>	

Verifier Issue	Issue ID:	20-13	Status: Closed	Checked by: BS	Date Identified	10-Aug-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description			Comments
	ERT worksheet	Non conformance. <i>May impact conformance; no impact on OMM</i>	Verifiers noted two discrepancies in the 27July2020 ERT worksheet (“Astoria_ACR_no_RP1 correction” tab) and discussed with the PP (David Ford) on August 10, 2020. These included: (1) missing cell references in formula in cell J26; and (2) incorrect buffer contribution listed for verified RP1 (cell F39).			Astoria_ACR_ERT worksheet_RP2_27Jul2020
			<u>11 August 2020 Findings</u> Verifiers have reviewed the revised ERT worksheet. The two noted discrepancies regarding the missing cell formula and buffer contribution for RP1 have been corrected. This issue is now considered closed.			Astoria_ACR_ERT worksheet_RP2_27Jul2020_Rev10Aug2020
OPO/APD Response						
Date	PP Comment				Additional evidence submitted for review by PP	

10-Aug-20	<p>e-mail from David Ford:</p> <p><i>"I made the revisions in the Astoria ERT worksheet - see attached.</i></p> <p><i>See cells:</i></p> <p><i>J26 - corrected formula</i></p> <p><i>F39 - deleted the buffer value</i></p> <p><i>H39 - entered the correct buffer contribution."</i></p>	<p><i>Astoria_ACR_ERT</i> <i>worksheet_RP2_27Jul2020_Rev10Aug2020</i></p>
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Verifier Issue	Issue ID:	20-14	Status: Closed	Checked by: BS	Date Identified	10-Aug-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description			Comments
ACR Standard v4.0	MR RP2	Clarification. May impact conformance; no impact on OMM	To help with transparency and clarity of modeling efforts completed in RP2, please provide a reference to the RP2 Modeling document in the appropriate section of the Monitoring Report.			Astoria_RP2_Modeling Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 1_15May 2020
			<u>20 August 2020 Findings</u> The PP has included a reference to the RP2 Modeling document in Section VI.2 of the Monitoring Report. This issue is now closed.			
OPO/APD Response						
Date	PP Comment				Additional evidence submitted for review by PP	
14-Aug-20	Section VI.2. was revised to reference the RP2 Modeling document. The revised Monitoring Report is in the shared Dropbox folder: Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > Monitoring Report				Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 2_14Aug2020	

Verifier Issue	Issue ID:	20-15	Status:	Closed	Checked by:	BS	Date Identified	10-Aug-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description			Comments		
ACR Standard v4.0	Sample design and	Clarification.	The <i>Astoria sample design</i> document describes the stratification process used during Reporting Period 2, which is based on the 2013 inventory stand characteristics (1 st			<p><i>Astoria sample design June2019</i> <i>AstoriaCruiseData</i></p>		

inventory data	May impact OMM or conformance.	<p>page). Verifiers understand the process utilized in delineating the conifer strata (CL and CH determined by threshold of avg BA > =250 ft²/ac) and the regeneration stratum (low stocking, regeneration harvest completed in 2013). For the Mixed-Hardwood stratum the <i>Astoria sample design</i> specifies:</p> <p><i>“The Mixed/Hardwood stratum includes the hardwood dominated stands grouped together with mixed (conifer and hardwood) because the former represented a relatively smaller proportion of the project area and had a similar species composition.”</i></p> <p>We are unclear on the process utilized in determining this stratum. For example, Stand 74 is delineated as a MH stratum. The 2013 inventory plot data shows one hardwood (red alder) out of 37 total trees, which represents a relatively small proportion of the basal area in this stand. In contrast, based on aerial imagery assessments, more extensive pockets of hardwood cover scattered within the stand.</p> <p>Verifiers request additional clarifications on the methods used to classify this stratum be incorporated within the <i>Astoria sample design</i> document. To help verify the stratification process, we are seeking the specific steps/process (BA threshold, % areal extent, etc.) applied in determining the Mixed/Hardwood stratum. Also, please include page numbers within this document for future referencing.</p>	<p><i>MBG_Astoria Invnetory Report_AppC Stands_Astoria_01232014.shp</i></p> <p><i>Astoria_InventoryMap.shp</i></p>
		<p><u>10 September 2020 Findings</u></p> <p>Verifiers appreciate the clarification on the 2019 stratification process; we understand the 2013 stand typing was used for the 2019 re-stratification. We also recognize the 2013 stand typing was validated and verified during RP1. Verifiers are not questioning the typing assignments of 2013, which the PP notes and the VB agrees with, is the basis for the 2019 stratification. Rather, we are seeking the specific methods and the supporting evidence used to derive the 2019 strata assignments and associated acreages. These strata acreages affect the calculation of the 2019 project stocks and ultimately the ERTs, both of which need to be verified during Reporting Period 2. We agree with the PP that the 2019 stratification process has no implications on the baseline or associated harvest scenarios.</p> <p>In regards to the 2019 stratification process for the Mixed Hardwood stratum, we understand this was determined by combining the 2013 stands that were typed as “Mixed” or “Hardwood” (attributes table in <i>Stands_Astoria_01232014</i> GIS shape files). Verifiers found a discrepancy between the acres of the 2019 Mixed Hardwood stratum provided in the <i>Astoria_live TreeCalcs_Rev_F_04Sept2020</i> workbook (tab “Pivot_Total”) with the acreage sum of the 2013 stands typed as “Mixed” and “Hardwood”. There are also discrepancies between these two documents for the other 2019 strata acreages (Regen, Conifer total= CL + CH).</p>	<p><i>Stands_Astoria_01232014.shp</i></p> <p><i>Astoria_liveTreeCalcs_RevF_04Sept2020</i></p> <p><i>Astoria sample design</i></p> <p><i>June2019_Rev_Sept2020</i></p>

		<p>Please review these strata acreage discrepancies and revise project documents as needed and appropriate.</p> <p>Once these discrepancies are resolved, this issue will be closed when the following has been provided: (1) a complete and transparent description of the methods utilized in transitioning the 2013 stand types (strata) to the current 2019 strata - please incorporate this description into the <i>Sample Design</i> document or similar appropriate supporting document; and (2) documentation, such as GIS shape files, providing the evidence to support the strata acreages utilized in estimating the 2019 project stocks.</p> <p>We acknowledge the page numbers have been added to the revised <i>Sample Design</i> document and this portion of the issue is closed.</p>	
		<p><u>22 September 2020 Findings</u></p> <p>Verifiers acknowledge the revised Sample Design document includes a complete description of the methods utilized in transitioning the 2013 stand types (strata) to the current 2019 strata.</p> <p>Verifiers can confirm the noted strata acreage discrepancies have been resolved. We understand the PP initially provided the incorrect spatial data (gross acreages in <i>Stands_Astoria_01232014.shp</i>) rather than the net acreages spatial data which removed excluded portions of the project area such as roads (<i>NetStrata_Astoria_09122020.shp</i>). This supporting spatial data has been provided and verifiers concur with the revised strata acreages. The revised strata acreages and associated ERT calculations have been accurately updated in the revised project documents. This issue is now closed.</p>	<p><i>Astoria sample design June2019_Rev_Sept2020.docx</i></p> <p><i>GHG Plan_Appendix B_Stand List REV_09_11_2020 .xlsx</i></p> <p><i>Astoria_liveTreeCalcs_Rev_F_13Sept2020.xlsx</i></p> <p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 4_15Sept2020.docx</i></p> <p><i>Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_Rev_13Sept2020.xlsx</i></p> <p><i>NetStrata_Astoria_09122020.shp</i></p>
OPO/APD Response			
Date	PP Comment	Additional evidence submitted for review by PP	
8-Sep-20	The new strata for the 2019 inventory were delineated based on the original stand typing completed in 2013 by the inventory contractor (Mason Bruce, & Girard). The project area was originally split into 117 forest stands based on various attributes – it appears on attributes such as species, broad age classes, and stocking; however, since the 2013 inventory took place prior to the initiation of the carbon project, the project developer did not have access to this information and the City of Astoria staff involved in the original inventory are retired.		

<p>For the 2019 inventory design, we used the original 2013 stand typing to group like stand types (ie. conifer, hardwood, regen). We then split the conifer stands into two groups, Conifer High and Conifer Low, based on average BA in each of the stands previously designated as “Conifer”, which is explained in the monitoring report. The Mixed Hardwood stratum was created by grouping together the previously designated “Hardwood” and “Mixed” stand types. The stands designated as “Regen” in the 2013 inventory were grouped together as “Regen” in the 2019 inventory.</p> <p>It is important to note that the stand types from the original inventory were validated/verified at the end of initial reporting period, so we were confident in using the original stand types as a basis for our new stratification. Further, Mason Bruce & Girard is a well-known and credible forestry consulting firm with significant experience in stratification and inventory work across the Pacific Northwest, so this also supported our decision to use the original stand types as a basis for our new stratification. Finally, we used recent aerial imagery (Google Earth) to assist in validating stand assignments to the appropriate strata.</p> <p>Please note that the stratification has no bearing on the management in the baseline or actual scenarios. The strata boundaries follow the original delineated stands. The baseline harvests are driven exclusively by NPV maximization which is based on the 2013 stand inventory data.</p> <p>Finally, the new 2019 inventory resulted in achieving our uncertainty target of <10% inventory sampling error.</p> <p>15 September 2020 Response</p> <p>S&A Comment (1) - a complete and transparent description of the methods utilized in transitioning the 2013 stand types (strata) to the current 2019 strata -please incorporate this description into the <i>Sample Design</i> document or similar appropriate supporting document.</p> <p>Response - The <i>Astoria sample design June2019_Rev_Sept2020</i> document was revised to describe how the 2013 stand types were assigned to the new inventory strata. It also now displays stratum assignments for each original stand ID that was classified in 2013 as commercial forest by Mason Bruce and Girard.</p> <p><i>Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > Inventory > Inventory Design > Astoria sample design June2019_Rev_Sept2020</i></p> <p>The new 2019 inventory sample frame did not include three stands (22, 32, and 125) that were regeneration harvested in 2013 because it was determined that these stands had no measurable volume. At the next re-inventory, plots will be allocated within this stratum to estimate carbon stocks from that point forward. The total project area is still 3,423</p>	<p><i>Astoria sample design June2019_Rev_Sept2020.docx</i></p> <p><i>GHG Plan_Appendix B_Stand List REV_09_11_2020 .xlsx</i></p> <p><i>Astoria_liveTreeCalcs_Rev_F_13Sept2020.xlsx</i></p> <p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 4_15Sept2020.docx</i></p> <p><i>Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_Rev_13Sept2020.xlsx</i></p> <p><i>NetStrata_Astoria_09122020.shp</i></p>
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<p>When applying the acres to the strata for calculating the revised carbon stocks and inventory statistics at the end of reporting period 2, an error was made by the GIS tech who used the older Stands_Astoria_01232014.shp shapefile as opposed to the verified NetStands_Astoria_02012016.shp shapefile – gross acres were used rather than net acres across the sample frame, and three stands (22, 32, and 125) that were regeneration harvested in 2013 were left out of the acreage calculations. The gross acres included the roads but left out the RH_2013 stratum acres, while net acres do not include roads and RH_2013 stratum acres. The error was not identified, in part, because the totals were only about one acre different. This error has been corrected and now the net acres for each stratum in the inventory sample frame are used in the live tree calculations and statistics. Also, the Monitoring Report and the ERT worksheet have been updated to reflect the acre corrections.</p> <p>S&A Comment (2) - documentation, such as GIS shape files, providing the evidence to support the strata acreages utilized in estimating the 2019 project stocks.</p> <p>Response - A revised GIS shapefile is available in the shared Dropbox that links each of the 2013 stand IDs to the 2019 inventory stratum assignment. In addition, a new Excel workbook was created that extracted the GIS shapefile attribute table that links the original 2013 Stand ID and typing to the 2019 strata assignments. See: <i>Astoria IFM-RP2 Docs_S&A Carbon Verification > RP2 Docs > GHG Plan_Appendix B_Stand List REV_09_11_2020</i></p>	
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Verifier Issue	Issue ID:	20-16	Status: Closed	Checked by: BS	Date Identified	26-Aug-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description		Comments	
ACR Standard v4.0		Clarification. <i>May impact OMM or conformance.</i>	<p>The PP has re-stratified the project area during RP2, in checking the GIS strata acreages we noted minor differences between the Verifier's and PP's values for strata and project acreages. Verifiers used both the <i>Astoria Inventory Map</i> shapefiles and the stand shapefiles for RP1. While the PP's project area is slightly greater than the verifiers (<0.1%), it does result in higher strata means and an over-estimate in project stocks (~500 tCO₂e), which has implications on RP's ERT's and cumulative effects over the project life.</p> <p>Additionally, there is minor discrepancy (1 acre) in the reported total project area between the <i>Astoria_liveTreeCalcs</i> and <i>Astoria sample design</i> (3,424 acres) to the</p>		<p><i>Astoria_InventoryMap.shp</i> <i>Stands_Astoria_01232014.shp</i></p> <p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 2_14Aug2020</i></p> <p><i>Astoria_Initial Monitoring Report_01_01_2014-09_30_2015_FINAL</i></p> <p><i>Astoria_liveTreeCalcs_Rev_F_13Aug2020</i></p>	

		<p>project area provided in the GHG Plan and the <i>RP1 & RP2 Monitoring Reports</i> (3,423 acres).</p> <p>Please review, clarify and revise as appropriate and needed.</p>	<p><i>Astoria sample design June2019</i></p> <p><i>Astoria_GHG Plan_FINAL.pdf</i></p>
		<p>10 September 2020 Findings Verifiers understand the project acreage discrepancies were likely the result of projection inconsistencies. The revised project documents (<i>TreeCalcs</i> workbook, <i>RP2 Monitoring Report</i>, and <i>Monitoring Report ERT</i> workbook) now show consistent project acreages (PA=3,422 acres). Verifiers calculated the same project area and concur with the revised values for project stocks and ERTs for 2019.</p> <p>Verifiers note, while the GHG Plan lists a slightly higher project area (3,422.74, rounded to 3,423 acres), the PP has utilized a more conservative project area of 3,422 in estimating project stocks for 2019 and plans to apply this project area in subsequent reporting periods. This issue is now closed.</p>	<p><i>Astoria_liveTreeCalcs_RevF_04Sept2020</i></p> <p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 3_06Sept2020</i></p> <p><i>Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_Rev_06Sept2020</i></p> <p><i>Astoria_GHG Plan_FINAL.pdf</i></p>
<i>OPO/APD Response</i>			
Date	PP Comment	Additional evidence submitted for review by PP	
6-Sep-20	<p>We recalculated (using ARCGIS) the acres for each stratum contained in the Astoria Inventory Map shapefile used as the basis for the new inventory design. We concluded that the acres reported in the <i>Astoria sample design June2019</i> and used in the <i>Astoria_liveTreeCalcs_Rev_F_13Aug2020</i> worksheet were slightly over reported (by just over one acre), most likely due to a projection inconsistency. We revised the acres in the <i>Astoria_liveTreeCalcs_Rev_F_13Aug2020</i> worksheet to match the Astoria Inventory Map shapefile acres.</p> <p>This revision in acres slightly reduced the Live Tree CO₂ Stocks reported at the end of Reporting Period 2 based on the new inventory – reduced by 509 t CO₂, which is a reduction of 0.051% from previously reported value. The project acres in the new inventory are 3,422.25 as compared to the initial GHG Plan stated acres of 3,422.74 (rounded to 3,423). This slight difference in acres (0.49 acres) is likely caused by a reprojection issue. To be conservative, we used the lower acre value (3,422.25) to calculate the new Live Tree CO₂ Stocks from the new inventory.</p> <p>In summary, we revised the <i>Astoria_liveTreeCalcs</i> worksheet to match the stratum acres in the Astoria Inventory Map shapefile and updated the Live Tree CO₂ Stocks reported at the end of Reporting Period 2 in the ERT worksheet – see cell “P29”. We also revised the RP2 Monitoring Report to reflect acres used in the new inventory and the resulting ERTs generated in RP2.</p>	<p><i>Astoria_liveTreeCalcs_Rev_F_04Sept2020</i></p> <p><i>Astoria_RP2 Monitoring Report_10_01_2015-12_31_2019_version 3_06Sept2020</i></p> <p><i>Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_Rev_06Sept2020</i></p>	

Verifier Issue	Issue ID:	20-17	Status: Closed	Checked by: BS	Date Identified	8-Sep-20
ACR Standard ref	GHG Plan Section	Significance	Issue Description			Comments
ACR IFM Methodology, v1.1, section F3	ERT workbook	Non conformance. May impact OMM or conformance.	There are Project Uncertainty calculation errors for all vintage years for Reporting Period 2 within the 3Sept2020 ERT workbook (tab "Astoria RP2_ERTs_Final"; cells J36, L36, N36 and P36). Please review and revise as appropriate. Also, please note the parameter units (i.e.%) for the associated Uncertainty headings in cells c35, c36 and c37.			Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_Rev_03Sept2020
			<u>20 August 2020 Findings</u> The PP has corrected the Project Uncertainty and Total Project Uncertainty calculation errors for all vintage years in the revised ERT monitoring workbook for Reporting Period 2. The PP has also labeled the Uncertainty units in cells c35-c37. This issue is now closed.			Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_Rev_06Sept2020
OPO/APD Response						
Date	PP Comment				Additional evidence submitted for review by PP	
8-Sep-20	e-mail from David Ford: "I corrected the workbook - see equations in cells J36, L36, N36, and P36. Since we are well below the 10% uncertainty threshold there is no impact on ERT values in RP2. These revisions for RP2 are included in the revised ERT worksheet."				Appendix A_Astoria RP2 Monitoring Report_ERT worksheet_Rev_06Sept2020	

Appendix C: Project Team

Verification Team	Qualifications
Bill Stack	<p>Bill Stack is a forester, natural resource manager, and ecosystem restoration specialist with over 29 years experience working on forest and aquatic ecosystems in the northeast and northwest US. He holds a master's degree in Forest Engineering from Oregon State University. He is an ARB accredited lead verifier and forest project specialist. Bill has participated on the verification of forest offset projects throughout the US including Alaska. Verification responsibilities included pre-site visit prep, forest inventory, data processing and analysis, developing findings, and report writing.</p> <p>Bill also provides a broad range of forest management consultation services to private landowners in preparing and implementing ecologically-based forest stewardship plans. He holds professional forester licenses in New Hampshire and Vermont. His comprehensive approach balances water, soil, wildlife, timber, recreation, aesthetics, and other resources with landowner goals and values.</p> <p>Previously, Bill has worked as a Senior Project Scientist with Stantec consulting on ecosystem restoration projects and as a Forest Hydrologist on interdisciplinary project teams for the USDA Forest Service.</p>
Lawson Henderson	<p>Lawson joined S&A Carbon as a Senior Associate in 2016, and expands the existing capacity of the forest carbon offset verification team. He is acts as an ARB Verifier on forest carbon offset projects, and is qualified as a Lead Offset Verifier under the ARB regulation. Lawson currently supports the S&A team with reviews of verification documents, field verifications of ARB forest carbon offset projects, and S&A's actions to become accredited under the American National Standards Institute – ANSI). Lawson brings nearly a decade of experience in forest certification through his prior employment with Rainforest Alliance, where he acted as a project manager and lead auditor of forest carbon offset projects against the major voluntary GHG programs, and FSC Forest Management & Chain of Custody Certifications. Lawson is qualified as a Lead Verifier under the Climate Action Reserve (CAR), and is also qualified as a AFOLU</p>

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	IFM Expert under the Verified Carbon Standard (VCS) program. He has led the validation and verification of IFM, AR & REDD forest carbon offset projects against the major voluntary GHG programs globally. He is a member of both the Gold Standard Foundation (GSF) Land Use and Forestry (LUF) and Oversight and Assurance (OA) Technical Advisory Committees (TAC). Lawson holds a B.S.F in forest management from the University of New Hampshire (2005).
Elizabeth McGarrigle	Elizabeth McGarrigle holds three forestry degrees (BScF, MScF, PhD). Her work has focused on forest inventory, growth and yield, and forest management planning. Her research focused on examining the impact of uncertainties in the inputs to long term forest management plans when optimization models are employed during the Master's program. While completing her PhD, she was part of the team developing a regional growth and yield model for the Acadian forest in the Northeastern United States and Canada. She developed a stand level model that is used to predict survivor growth, ingrowth, and mortality in the region. As part of her dissertation, she focused on several variants of the Forest Vegetation Simulator and several regional growth and yield models from across Canada and the United States. Dr. McGarrigle is currently working with the provincial government in Nova Scotia Canada as a Forest Inventory Data Analyst where she is responsible for the design and analyses of permanent sample plots. In addition to her work as a biometrician on several ARB forest projects, she has also been involved in research at Natural Resources Canada using a fine scale forestry model to assess the impact of climate change on species composition in forest types across Canada.
Caitlin Littlefield	Caitlin Littlefield is a broadly trained forest ecologist and holds a PhD at the School of Environmental and Forest Sciences at the University of Washington. Her research focuses on climate adaptations in fire-prone forests and modeling connectivity across western forested landscapes. Prior research and consulting work entailed assessing bioenergy harvesting impacts in northern New England, modelling carbon storage under various management scenarios on former industrial timberlands

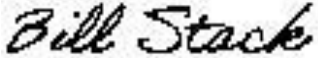
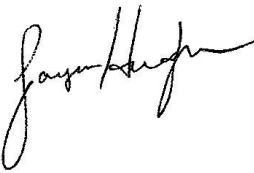
Verification Team	Qualifications
	in Vermont (using FVS), and developing relational databases and tools for state natural resource agencies. She has extensive field experience throughout New England and the Pacific Northwest and has participated in four field verifications of forest carbon projects.
Robert Turner	Robert Turner holds a BS in finance and a MS in forest management. He brings over 25 years of experience in forest management consulting, primarily in the northeastern US. This experience spans a broad range of technical and analytical services, often related to forest inventory and management planning, mensuration, growth and yield modeling, financial modeling, information and decision support systems, and spatial analysis. His expertise in long-term timber supply modeling has supported state and regional forest policy in all the states of the Northern Forest. Robert is accredited as a lead verifier by ARB under their Forest and Urban Forest protocols and has been a verifier/biometrician on fifteen forest carbon projects under CAR, ARB & VCS standards. He is an SAF Certified Forester.
Alexa Kandarlis	Alexa has 4 years' experience in carbon auditing and climate change mitigation policy and is accredited by ARB as a verifier under their US Forests protocol. In this time, she has participated in over 150 verifications of carbon offset projects and corporate inventories under a variety of GHG programs, including the Air Resources Board, Climate Action Reserve, American Carbon Registry, and Carbon Disclosure Project. Alexa developed tracking systems for a program registered under the Clean Development Mechanism as a Program of Activities and has been involved in registering this program of activities with the Gold Standard. Prior to this, Alexa conducted extensive research on emissions leakage in addition to authoring work pertaining to the structure of California Assembly Bill 32. Alexa is currently responsible for implementation of S&A's corporate management system to ensure ongoing improvement and compliance with ISO requirements. In addition to this, she has field experience with Forestry, Ozone Depleting Substances, and Livestock verification projects and is qualified as a lead

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	verifier for GHG inventory verifications. She holds a Bachelor of Arts in Economics with a minor in Business Administration, and a focus on natural resource and environmental Economics.
Kyle Silon	Kyle Silon holds an M.S. in Energy and Environmental Economics and is an ABR accredited Lead Verifier. He has ten years' experience in climate change mitigation strategies and carbon reduction projects. Prior to founding S&A, he worked for a leading international certification company, specializing in validation and verification of small-scale household energy demand projects (such as cook stove and water filter projects), primarily located in South America, Asia, and Africa. He has participated in numerous verifications of forestry, landfill, and livestock projects, and has worked across all major GHG programs, including the Air Resources Board, Verified Carbon Standard, Climate Action Reserve, American Carbon Registry, Gold Standard, and Clean Development Mechanism (CDM).
Alex Powell	<p>Alex Powell has a BS degree from Humboldt State University, 2006, majoring in Wildlife Management. He has been employed in the forestry business since 2008, and has worked with Blair Forestry Consulting since 2014. He has experience with inventory data collection. He is experienced with all equipment necessary for cruising (releskop, impulse laser for heights and distances, spencer tape, biltmore stick, etc.) as well as species identification, and keeps field notes and data organized. He has collected data on field sheets and handheld devices, and has organized and interpreted data in the office. Additional experience is described below.</p> <p>Timber Harvest Plan preparation, filing and implementation (field work and written document, Pre-harvest Inspections, LTO interactions); Interpretation and implementation of the Forest Practice Rules; Watercourse classification; Identification of fish bearing streams; Identification and protection of habitat for rare species and species of concern; Road and crossing assessment and improvement</p>

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	recommendations and sediment reduction strategies; Preparation of Lake or Streambed Alteration agreements and 1600s; Identification and assessment of cumulative impacts; Botanical surveys; Overstory and understory species identification; Data management and organization; Work in rugged terrain and inclement weather, individually or in small crews, navigation of remote forest roads and use of ATV; Use of GIS and GPS for both in office assessment and in field data collection and navigation; Extensive use of computers (Microsoft Excel, Word, Access) and internet research

APPENDIX C: VERSION TRACKING

Version	Date	Developed By	Version Notes
1.0	9/23/2020	Alexa Kandarisi/Kyle Silon	Initial Document
1.1	9/28/2020	Bill Stack	Final Document submitted for Technical Review
1.2	9/29/2020	Bill Stack	Final Document updated in response to Technical Reviewer comments
1.3	9/30/2020	Lawson Henderson	Final Document approved by Technical Reviewer
1.4	10/1/2020	Alexa Kandarisi	Final Document approved by Internal Approver
1.5	10/27/2020	Bill Stack/Lawson Henderson	Revised Final Document in response to ACR review comments Approved by Internal Reviewer

S&A Carbon Lead Verifier Name and Signature:	Bill Stack 
S&A Carbon Technical Reviewer Name and Signature:	Lawson Henderson 
Date:	10/27/2020