REFORESTATION AND RESTORATION OF DEGRADED MANGROVE LANDS, SUSTAINABLE LIVELIHOOD AND COMMUNITY DEVELOPMENT IN MYANMAR

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Summary:

4KES, commissioned by Worldview International Foundation (WIF) is performing verification of the project activity "Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar", against VCS Version 04 and all applicable requirements therein, for the monitoring period from 15/06/2019 to 14/06/2020.

The project activity consists of restoration and reforestation activities of a mangrove habitat located in the northern part of Ayeyarwady Division of Myanmar in three village tracts namely Magyi, Thabawkan and Thaegone in ShweThaung Yan Township.

The CDM afforestation and reforestation Large-scale Methodology: AR-AM0014 "Afforestation and reforestation of degraded mangrove habitats, version 3.0." and corresponding tools are applied to quantify the

GHG removals achieved in this project.

The Worldview International Foundation (Project Proponent) has requested 4KES to perform the 3rd VCS verification audit, for which a Monitoring Report, a Non-Permanence-Risk Report and supporting documents were provided. 4KES, acting as an independent third party, has assessed the documents and evidences provided, and performed desk assessment and virtual assessment, which included a desk review, interviews with stakeholders, interviews with the top management of PP and interviews with the technical and field staff of the project activity. 4KES tram verified the information contained and the emissions reductions and/or removals claimed in the Project Implementation Report, calculated in compliance with the requirements of the Verified Carbon Standard (VCS) and the requirements of the methodology applied.

In total 02 Clarification Request, 01 Corrective Action Request and 01 Forward Action Request were raised.

After performing the verification audit, 4KES confirms that the Project complies with all the requirements of the Verified Carbon Standard, having generated 53,369 tCO_2 equivalents net emission reductions during the present reporting period, after discounting 10% for buffer.

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1 INTRODUCTION

1.1 Objective

4KES has been commissioned by Worldview International Foundation (WIF) to perform an independent verification of its VCS project, "Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar", already registered under VCS with Project ID. 1764 for the reported GHG emission reductions for the given monitoring period 15/06/2019 up to 14/06/2020 (both dates included). The VCS projects must undergo independent third party verification and certification of emission reductions as the basis for issuance of Voluntary Emission Reductions (VERs/VCUs).

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- *The project activity has been implemented and operated as per the project description (PD) and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;*
- *Monitoring report and other supporting documents are complete;*
- *The data is recorded and stored as per the monitoring methodology and approved monitoring plan.*
- *To confirm that the monitoring system is implemented and fully functional to generate Voluntary Emission Reductions (VERs/VCUs) without any double counting, and*
- *To establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.*

1.2 Scope and Criteria

The verification scope is:

- *to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan;*
- *to evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement;*
- *to verify that reported GHG emission data is sufficiently supported by evidence.*

The project is assessed against the of VCS program guide v 4.0, VCS standard v4.0. *4KES has, based on the recommendations in the latest version of VCS Validation and Verification Manual v 3.2, and employed a rule-based approach (as criteria) in the verification, focusing on the identification of significant reporting rules and the reliability of project monitoring.*

Verification is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

1.3 Level of Assurance

The final verification report before being submitted to the client were subjected to an independent internal technical review to confirm that all verification activities had been completed according to the pertinent 4KES instructions, with reasonable level of assurance.

The technical review was performed by a technical reviewer(s) qualified in accordance with 4KES qualification scheme for VCS validation and verification.

The verification team and the technical reviewers consist of the following personnel.

Role	*Last Name*	*First Name*	*Country*
Team Leader, Technical Expert and Host country Expert	*Menon*	*Rekha*	*India*
Technical Reviewer	*Padmanabha*	*Sudha*	*India*

1.4 Summary Description of the Project

Project Proponent	*Worldview International Foundation*
Title of the project activity	*Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar*
Baseline and monitoring methodology	*AR-AM0014, Afforestation and reforestation of degraded mangrove habitats", Version 03.0 dated 04/10/2013*
Location of the project activity	*The proposed project is implemented on 2146.48 Ha of the degraded lands of Magyi, Thabawkan and Thaegone village tracts of the Northern part of Ayeyarwady Division of Myanmar*
Projects crediting period	*15/06/2015 to 14/06/2035*

2 VERIFICATION PROCESS

2.1 Method and Criteria

Verification is conducted using 4KEarth procedures in line with the requirements specified in the VCS Standards and applying standard auditing techniques. The verification consisted of the following three phases:

- *Document review;*
- *Follow-up actions (Remote audits)*
- *The resolution of outstanding issues and the issuance of the final validation report.*

The following sections outline each step in more detail.

Sampling and data testing activities were planned to address any risk where the likelihood of a material discrepancy not being detected by the audit team was judged to be unacceptably high. The verification plan also took the sampling plan into account.

2.2 Document Review

The registered PD, version 3.0 of 19/02/2018 /01/, in particular the applicability of the methodology, the baseline determination, the MR version 1.0 of 31/07/2020 and version 2.0 of 29/09/2020, emission reduction calculations provided in the form of a spreadsheet (VCUs for 2015-2017 plantations.xlsx, VCUs for 2018 plantation.xlsx and VCUs for 2019 plantation.xlsx) version 01 submitted on 31/07/2020 and (Consolidated Calcs Data V2 - 28th Sep.xlsx, VCUs for 2015-2017 plantations V2 - 28th Sep.xlsx, VCUs for 2018 plantation V2 - 28th Sep.xlsx and VCUs for 2019 plantation V2 - 28th Sep.xlsx) version 02 of 28/09/2020, and the documents listed in the table below, were reviewed during the offsite – audit.

The following table lists the documentation that was reviewed during the verification.

/01/	*WIF: VCS monitoring report for the project activity "Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar", version 1.0 of 31/07/2020 and version 02 of 29/09/2020*
/02/	*WIF: VCS project description for project activity "Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar", version 3.0 of 19/02/2018*
/03/	*WIF: Emission Reduction spread sheets ((VCUs for 2015-2017 plantations.xlsx, VCUs for 2018 plantation.xlsx and VCUs for 2019 plantation.xlsx) version 01 submitted on 31/07/2020 and (Consolidated Calcs Data V2 - 28th Sep.xlsx, VCUs for 2015-2017 plantations V2 - 28th Sep.xlsx, VCUs for 2018 plantation V2 - 28th Sep.xlsx and VCUs for 2019 plantation V2 - 28th Sep.xlsx) version 02 of 28/09/2020*
/04/	*WIF: Non permanence risk report, version 1.0 of 31/07/2020*
/05/	*VCS: VCS Program Guide, VCS Version 4.0 of 19/09/2019*
/06/	*VCS: VCS Standard, VCS Version 4.0 of 19/09/2019*
/07/	*VCS: VCS-Risk-Report-Calculation-Tool-v4.0.xls*
/08/	*CDM Executive Board: Approved large scale CDM methodology AR-AM0014 Version 3.0 "Afforestation and reforestation of degraded mangrove habitats", dated 04/10/2013.*
/09/	*CDM Executive Board: Demonstration of eligibility of lands for A/R CDM project activities, version 02.0, dated 04/10/2013*
/10/	*CDM Executive Board: Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (version 04.2), dated 24/07/2015*
/11/	*CDM Executive Board: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities" (version 03.1), dated 24/07/2015*
/12/	*CDM Executive Board: Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity" (version 02.0), dated 04/10/2013*

/13/	*CDM Executive Board: Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0_, dated 25/11/2011*
/14/	*WIF: Final planting inventory 2019.xlsx*
/15/	*Purchase of seeds – Vouchers April to June 2019*
/16/	*WIF: Financial manual for field project implementation, 22/05/2020*
/17/	*Training records:* *GIS & Forestry inventory training program – year 2020* *Attendance sheet, dated 31/05/2020* *Photos of trainings conducted.*
/18/	*WIF: Completion report on beekeeping training, 09/02/2019*
/19/	*Measurement sheets:* *Data of the Sample plots planted in 2015 V2 - 28th Sep.xlsx* *Data of the Sample plots planted in 2016 V2 - 28th Sep.xlsx* *Data of the Sample plots planted in 2017 V2 - 28th Sep.xlsx* *Data of the Sample plots planted in 2018 V2 - 28th Sep.xlsx* *Data of the Sample plots planted in 2019 V2 - 28th Sep.xlsx* *Measurement Summary - Averages V2 - 28th Sep.xlsx*
/20/	*4KES: Attendance sheets on stakeholders interviewed*
/21/	*Project boundary maps* *2015-2017 planting area maps* *2018 planting area maps* *2019 planting area maps*
/22/	*WIF: Raw data sheets* *2015-2017 Magyi readings* *2018 – Thabawkan readings* *2019- Thegone measurements*
/23/	*Photos of instruments used in measurements.*
/24/	*Organizational Structure and QA/QC procedures for Mangrove restoration project in Magyi, Thabawkan and Thaegone of Myanmar, Version 3.0 of 05/ 2020*
/25/	*WIF: Local stakeholder's minutes of meeting, dated 03/05/2019, 12/05/2019, 24/06/2019, 05/07/2019, 24/09/2019, 30/09/2019 and 20/10/2019*
/26/	*WIF: kml files of sample plots of 2015-2017, 2018 and 2019*
/27/	*Annex-1 Species distribution: Southern Asia: Along the coasts of India, Myanmar, Malaysia and Thailand by U Saw Han and Saw Tun Khaing*
/28/	*WIF: Supervision of project activities, roles and responsibilities.*
/29/	*The World Bank: Calculation of Governance Scores for Myanmar*

	https://info.worldbank.org/governance/wgi/#home
/30/	UN-REDD programme: Myanmar: Progress against the Warsaw framework for REDD+
/31/	Myanmar: Disaster Management Reference Handbook, 01/2017
/32/	Mangrove conservation as sustainable adaptation to cyclonic risk in Kendrapada District of Odhisha, India by Chandra Sekhar Bahinipati and Nirmal Chandra Sahu.
/33/	Hazard profile of Myanmar, 07/2009
/34/	WIF: Annex 8 VCS-Risk-Report-Calculation-Tool-v4.0.xls
/35/	WIF: New livelihood initiatives, 2019/2020
/36/	WIF: Bee keeping training report.
/37/	VERRA: COVID-19 travel guidance for projects (https://verra.org/covid-19-travel-guidance/) issued on 18/03/2020
/38/	TUV SUD South Asia Pvt Ltd: 2nd verification report, Report No. 10502MO, dated 10/10/2019
/39/	RINA: Validation report ,16IQMD40_1.1Aa, dated 26/02/2017
/40/	Photos and videos of the plantations and measurements carried out.

2.3 Interviews

The key personnel interviewed, and the main topics of the interviews are summarized in the table below.

	Date	Name and Role	Organization	Topic
/a/	14/09/2010	Dr. Arne Fjortoft (Secretary General)	WIF	VCS consideration, funding of the project, Commercial operation date of the project, Land tenure rights, Pre-project conditions, project implementation status and financial viability of the project.
/b/	14/09/2010	Mr. Bo Ni (Mangaing Director)	WIF	Project implementation status, Project boundary, area covered, species selected, sample plot selection, planting technique used, survival rate, monitoring of the project.
/c/	14/09/2020	Mr. Win Maung (Project Manager)	WIF	
/d/	14/09/2020	Dr. Htay Aung (Professor)	Pathein University	Role of Pathein University, soil carbon studies, land rights, Environmental Socio-Economic Impacts, hydrological data.
/e/	14/09/2020	Aung Aung Mynt	GIS&RS specialist	Baseline stratification, aerial and satellite

				imageries, project boundary, sampled plots.
/f/	*14/09/2020*	*Suraj A. Vanniarachchy (AFOLU carbon project development specialist)*	*Ex-WIF*	*Baseline, Data storage and Archiving procedures, Trainings, Site Preparation Activities, Baseline stratification, Sample plot calculation, Emission Reduction calculations, risk assessments and calculations, additionality, start date and crediting period.*
/g/	*14/09/2020*	*Sachini Jayakody (Carbon consultant)*	*The Carbon Consulting Company*	
/h/	*14/09/2020*	*Mr. U Kan Htun (Assistant Director)*	*Forest Department*	*Laws and policies, roles and responsibilities of forest department and encroachment*
/i/	*14/09/2020*	*Mr. U Chit San Village committee chairman Mr. U Tin Win (Village elders)*	*Thabawkan village tract*	*Land agreement between village committee and WIF, project impact on stakeholders, livelihood of the villagers, income generation, trainings, sustainable development and role and responsibility of villagers*
/j/	*14/09/2020*	*Mr. U Ye Kyaw Thu (Village tract Administrator) Mr. U Khin Swe Oo (Village tract Administrator)*	*Shwe Thaung Yan Village*	
/k/		*Mr. U Saw Dunay (Incharge of Village*	*Polaung Village*	
/l/		*Mr. U Saw Hazel Village tract Administrator*	*Wetthe Village*	
/m/		*Mr. KoMin Min Htike (Hundred house elder)*	*Thaegone Village*	

2.4 Site Inspections

The verification team could not visit the site due to COVID-19 pandemic and subsequent travel restrictions. The DOE could not postpone the site visit due the prevailing uncertainty in travel restrictions and the deadline for completion of the project as per the signed contract between the DoE and the PP. Additionally, it is noted that there is no mandatory VCS Program requirement that mentions that a site visit must be conducted (even for forestry projects). However, to make sure that the VVB complies with the clause 4.1.2 of VCS Standard Version 4.0, all the information provided in the revised MR and ER spread sheets /01/ /03/ was verified during the desk-review phase against credible sources and interviews with concerned stakeholders were carried out. It is to be also noted that more than three years have not elapsed since the last onsite inspection was conducted. Since an onsite inspection is avoided, the verification team decided to carry out the audit by other means of standard auditing techniques, which included video conference calls, videos of the site, videos of the plantation, videos of measurements, pictures of measurements undertaken in each sample plot, pictures of measuring devices in place, raw data sheets and Zoom interviews. The same is as per the VCS- COVID travel guidance (https://verra.org/covid-19-travel-guidance/) /37/.

During the desk assessment of the project, the verification team assessed the implementation and operation of the proposed project activity, the status of the plantation, area covered /21//26/, any changes in sample plots, SOPs in place for measurement and silviculture operations, field measurement data, interviewed key personnel /20/ of the plant to crosscheck the procedure adopted in field measurements /22/, crosschecks between field data and ER sheets. The values used in the ER calculations /03/ were confirmed by means of checking the records of raw data sheets provided by the client for all the sample plots. Also, checked the quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters /24/.

2.5 Resolution of Findings

The objective of this phase of the verification is to resolve any outstanding issues which need to be clarified for 4K earth's positive conclusion on the project description. To guarantee transparency any findings raised during the verification are incorporated in the Appendix A to this report. A corrective action request (CAR) is raised if one of the following occurs:

- *The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions.*
- *The VCS Version 4.0 standard have not been met.*
- *There is a risk that the emission reductions cannot be monitored or calculated.*

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS Version 4.0 standard have been met.

The No. of CARs/CLs raised by 4 K earth are the following

CAR:1, CL: 02 and FAR: 1

2.5.1 Forward Action Requests

The following FAR was raised during the previous verification /38/.

FAR 1

For the future monitoring it has to be ensured, that the self-imposed QA/QC requirements of remeasuring 20% of the sample plots is fulfilled.

PPs Response:

PP has confirmed to conduct QA/QC procedures of remeasuring 50% of the sample plots. These data sheets will be cross checked by the field manager before taking into VCU calculation and other research. This has been already included in the "organization Management structure & QA/ QC" and will be strictly monitored by the project director and carbon consultant during each data collection process.

DoEs Response:

The verification team checked the field measurement data sheets, which confirms that there is a cross check from the field manager, and this was not only for 50% samples but for all the samples. The same was also confirmed by interacting with the field manager and project manager. Thus, the FAR is closed.

2.6 Eligibility for Validation Activities

4K earth is a validation/Verification body, which holds accreditation for validation for the relevant sectoral scope under the VCS program. Validation Findings

2.7 Participation under Other GHG Programs

PP has confirmed that there is no other form of GHG-related environmental credit generated by the proposed project activity.

2.8 Methodology Deviations

No methodology deviation applicable.

2.9 Project Description Deviations

As per the registered VCS-PD, the project will be implemented on 2146.48 hectares, which covers 1607.81 ha of area to be planted and 538.67 ha of area to be restored. The planting activities planned for these areas are from 2015 to 2020. However, as per the previous verifications i.e. the first and 2nd verification an area of 72.12 was excluded due to various reasons, which was verified and concluded in the previous verifications /38/ /39/ and in the proposed verification an area of 3.30 ha was excluded. The field team identified these areas as not suitable for planting. The report of the same was communicated to WIF HO, which was accepted to exclude these areas from planting. Revised project boundary file "2019 Planting Area Maps" checked and accepted by the validation team. Thus, the total area covered under the project activity is only 2071.06. The MR confirms that the plantation activities have been completed and there would not be any more plantation. The same was also confirmed by interacting with the PP. The VVB confirms that the decrease in the area, does not impact the additionality, baseline nor applicability of the project activity. Moreover, this is also as per clause 4 of EB 66, Annex-24 of "Guidelines on accounting of specified types of changes in A/R CDM project activities from the description in registered project design documents", (version 02.0) of 02/03/2012

2.10 Grouped Project

The verification team confirms that the project is not a grouped project and hence this is not applicable to the project activity.

3 VERIFICATION FINDINGS

3.1 Project Implementation Status

The project implementation status is explained in detail in section 3.1 of the MR. As per the interviews had with the PP and the supporting evidences provided to the verification team, it is confirmed that the project is fully operational and all the planting activities as discussed in the registered PD have been completed. As discussed in section 3.1 of the MR, the planting activities started in 2015 and the same has been completed by 2019. The total area planted is 2071.06 ha. For more details in the deviation from the registered PD, please refer to section 2.9 of the report. The changes in area and project boundary was verified by crosschecking the revised project boundary files /21/.

PP has confirmed that there is no other form of GHG-related environmental credit generated by the proposed project activity /01/. The project has not received any other form of GHG credits or environmental credits since the last verification. The proposed project activity is an ARR project activity, and it is located in Least Developed Country (LDC). It was confirmed that Myanmar has no binding limits on GHG emissions or compliance requirements under international multilateral agreements. GHG removals generated by this project will not be used for compliance with binding limits to GHG emissions since such limits are not enforced in Myanmar. There are no emissions trading programs in place in the country. Consequently, this project will only generate net GHG emission reductions on an additional and voluntary basis. The same has been confirmed in the VCS PD, version 3.0 of 19/02/2018 and the MR, version no. 2.0 of 29/09/2020 nor it has participated in any other mechanism that includes GHG allowance trading.

The project contributes to sustainable development in multiple ways, which includes environmental, social and economic criteria. The implementation of the project has not only led to reduction in GHG emissions but also protecting the biodiversity, conserving water soil and air. Improvement in rural economic development and the quality of life among the vulnerable coastal communities by generating new employment opportunities. Also, change in lifestyle and infrastructure development by training the villagers on social entrepreneurship, which included honeybee production, clam's production, a small yard for boat building, production of energy saving stoves, sea weed production, virgin coconut production, ice plant for fishing industry, aquaculture projects with emphasis on crab farming. It was also checked that PP has also employed livelihood managers, who interact with villagers on day to day to basis and also keep a track on the sustainability monitoring parameters in terms of income generation, employment, skill development and upcoming training needs /35/. The verification team also interacted with the village heads of Magyi, Thabawkan and Thaegone and confirms that the information provided in the MR is appropriate.

No Methodology deviations noted since the last verification /38/. Based on the desk observations and interactions with the stakeholders it is confirmed that the project has been implemented as described in the project description.

3.2 Safeguards

3.2.1 No Net Harm

The proposed project is reforestation and restoration of mangrove forest, with no commercial utilization of timber. Thus, there are no negative environmental impacts due to the project activity. This was confirmed by interviewing the local stakeholders, the chairman and the village leaders of the respective village tracts, where the project is implemented /20/. In fact, the project will lead to positive impacts like low income families in the area will get more opportunities to increase their income, new employment opportunities, knowledge in

silviculture, infrastructure development and change in lifestyle of local villagers. The project does not foresee any negative impacts. This was also confirmed from the socio-economic survey reports of Magyi, Thabawkanand Thaegone village tracts.

3.2.2 Local Stakeholder Consultation

4KES audit team has reviewed Section 2.2 of the VCS-MR. Noted that there is a continuous process of ongoing local stakeholders' consultation. Stakeholder consultation for the proposed monitoring period were carried out on 03/05/2019, 12/05/2019, 24/06/2019, 05/07/2019, 24/09/2019, 30/09/2019 and 20/10/2019. Minutes of the meeting /25/and attendance sheets were checked /25/. Noted that the project has not received any negative comments. Moreover, the local villagers are happy with the facilities provided by WIF. The various inputs and suggestions given by the local stakeholders during these meetings were compiled and incorporated for the betterment of sustainable livelihood in the villages.

During the video conferencing, 4KES team interacted with the village tract leaders, who have expressed that, their families have benefited socially and economically from the implementation of the project and they do not have any negative comments on the project. The same was also confirmed by the official from forestry department. Thus, no negative comments received during the on-going communication with stakeholder, hence no change in the project design envisaged during the current monitoring period.

The validation team confirms that the project continues to communicate the necessary relevant information about the project implementation, risks, costs and benefits, relevant laws and regulations and the process of VCS Program verification during the monitoring period.

3.3 AFOLU-Specific Safeguards

Impacts on local stakeholders is discussed in more detail in section 3.2. The verification team concludes that the project proponent has taken the appropriate measures to ensure that the project has not created negative impacts on local stakeholders or mitigated such impacts where necessary.

3.4 Accuracy of GHG Emission Reduction and Removal Calculations

3.4.1 Baseline emissions or removals

As per the methodology AR-AM0014, the baseline net GHG removals by sinks comprises of following components:

Baseline Emissions:

$$\Delta C_{BSL,t} = \Delta C_{TREE\_BSL,t} + \Delta C_{SHRUB\_BSL,t} + \Delta C_{DW\_BSL,t}$$ Equation (1)

Where:

$\Delta C_{BSL,t}$ = *Baseline net GHG removals by sinks in year t; t CO_2e*

$\Delta C_{TREE\_BSL,t}$ = *Change in carbon stock in baseline tree biomass within the project boundary in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2e (AR-TOOL14)*

$\Delta C_{SHRUB\_BSL,t}$ = *Change in carbon stock in baseline shrub biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2e (AR-TOOL14)*

$\Delta C_{DW\_BSL,t}$ = *Change in carbon stock in baseline dead wood biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO_2e (AR-TOOL12)*

Section 5 of the above referred methodological tool AR-Tool 14 explains 3 conditions under which carbon stock and change in carbon stock may be estimated as zero. As per the tool the carbon stock in trees in the baseline can be accounted as zero if all of the underlying conditions therein the tool are met. The validation report reveals that pre-project trees are neither harvested, nor cleared, nor removed due to implementation of the project activity. Further, no pre-project tree mortality issue occurs because of leaving enough space for these trees to grow and lastly these trees are not inventoried along with the project trees in monitoring of carbon stocks and the monitoring plan takes care of monitoring its continued existence within the project boundary. Thus, the verification team accepts the argument on zero baseline emissions.

Quantification of project emissions

As per section 5.2 of the MR, the ex-post actual net GHG removals by sinks were estimated using the equation 2 described in section 5.5 of the methodology AR-AM0014: Afforestation and reforestation of degraded mangrove habitats Version 03.0. The following are the equations used for the purpose:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t}$$ Equation (2)

Where:

$\Delta C_{ACTUAL,t}$ = *Actual net GHG removals by sinks, in year t; t CO2-e*

$\Delta C_{P,t}$ = *Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO2-e*

$GHG_{E,t}$ = *Increase in non-CO2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t, as estimated in the tool "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity"; t CO2-e*

For calculating the change in the carbon stocks in project, occurring in the selected carbon pools in year t,PP has used the following equation as referred in the methodology:

$$\Delta C_{P,t} = \Delta C_{TREE\_PROJ,t} + \Delta C_{SHRUB\_PROJ,t} + \Delta C_{DW\_PROJ,t} + \Delta SOC_{PROJ,t}$$ *Equation (2)*

Where:

$\Delta C_{P,t}$ = *Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO2-e*

$\Delta C_{TREE\_PROJ,t}$ = *Change in carbon stock in tree biomass in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2-e*

$\Delta C_{SHRUB\_PROJ,t}$ = *Change in carbon stock in shrub biomass in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO2-e*

$\Delta C_{DW\_PROJ,t}$ = *Change in carbon stock in dead wood in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO2-e*

$\Delta SOC_{PROJ,t}$ = *Change in carbon stock in the soil organic carbon (SOC) pool within the project boundary, in year t; t CO2-e*

As per the registered VCS PD and the MR, estimation of the changes in carbon stocks in shrub biomass assumed as zero since no shrubs are planted as part of this project. Similarly changes in carbon stocks in dead wood are also not estimated following the conservative approach outlined in the methodology. Whereas change in carbon stock in tree biomass and change in carbon stock in the soil organic carbon (SOC) pool within the project boundary are estimated by using the equations given in the below paragraphs:

Estimation of the changes in carbon stocks in tree biomass: $\Delta C_{TREE\_PROJ,t}$

The change in carbon stock in tree biomass was estimated by using the A/R methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (Version 04.2). As per the tool, the stock difference method was adopted and the ex-ante tree biomass was estimated using the method given in "Estimation by modelling of tree growth and stand development", as presented in section 8 of the tool. For the estimation of the changes in carbon stocks in tree biomass ex-post, field measurements in permanent sample plot at two points of time is realized, and the calculations are done following the "difference of two independent stock estimations" method, available in section 6 of the tool. Actual field measurements were used in combination with tree growth models to estimate the growth of trees and the development of the tree stand over time. The verification team checked that the PP has measured all the permanent sample plots of 54 as discussed in the registered PD. The verification team checked the field data of 33 sample plots with the raw data and photos of tree measurements along with the geo co-ordinates and the same was found to be acceptable.

Estimation of the changes in carbon stocks in soil organic carbon $\Delta SOC_{PROJ,t}$

Changes in carbon stocks in the SOC pool is calculated by using equation (3) given in the Methodology AR-AM0014 (03.0):

$$\Delta SOC_{PROJ,t} = \frac{44}{12} \times \sum_{t=1}^{t} A_{PLANT,t} \times dSOC_t \times 1\ year \qquad \text{Equation (3)}$$

Where:

$\Delta SOC_{PROJ,t}$ = *Change in SOC stock within the project boundary, in year t; t CO2-e*

$A_{PLANT,t}$ = *Area planted in year t; ha*

$dSOC_t$ = *The rate of change in SOC stocks within the project boundary, in year t; t C ha-1 yr-1. The following default value is used, unless transparent and verifiable information can be provided to justify a different value:*

(i) $dSOC_t$ *= 0.50 t C ha-1 yr-1 for t = tPLANT to t = tPLANT + 20 years, where tPLANT is the year in which planting takes place;*

(ii) $dSOC_t$ *= 0 t C ha-1 yr-1 for t > tPLANT +20.*

PP has used a soil carbon accumulation rate of 7.32 tc/ha/yr for ex-ante estimation of changes in carbon stock in soil organic carbon. Further PP argues that the values and assumptions used in this report are conservative as far as the location of the project area is concerned and hence the value chosen is appropriate. For more information please refer to FAR 1.

Estimation of Project emission (GHGE,t)

As per paragraph 15 of the methodology, GHGE,t shall be estimated by using the A/R Methodological tool "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity" (Version 04.0).

a) The tool is applicable to all occurrence of fire within the project boundary.

b) Non-CO_2 GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area greater than the minimum threshold area reported by the host Party for the purpose of defining forest, provided that the accumulated area affected by such fires in a given year is ≥5% of the project area.

As per the registered VCS -PD, this tool is not applicable to the project activity.

Quantification of leakage

Not applicable as per the registered PD.

Summary of net GHG emission reductions or removals

As per VCS PD section 3.4, the net anthropogenic GHG removals by sinks is calculated by using the equation below:

$$\Delta C_{AR-CDM,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_t \qquad \text{Equation (4)}$$

Where:

$\Delta C_{AR-CDM,t}$	=	*Net anthropogenic GHG removals by sinks, in year t; t CO2-e*
$\Delta C_{ACTUAL,t}$	=	*Actual net GHG removals by sinks, in year t; t CO2-e*
$\Delta C_{BSL,t}$	=	*Baseline net GHG removals by sinks, in year t; t CO2-e*
LK_t	=	*GHG emissions due to leakage, in year t; t CO2-e*

PP has provided a spread sheet (Consolidated Calcs Data V2 - 28th Sep.xlsx, VCUs for 2015-2017 plantations V2 - 28th Sep.xlsx, VCUs for 2018 plantation V2 - 28th Sep.xlsx and VCUs for 2019 plantation V2 - 28th Sep.xlsx, /03/ '. As per the estimation, the total GHG emission reductions and removals from the project for the current monitoring period (15/06/2019 to 14/06/2020) is 59,299 tCO2e and after 10% buffer pool allocation i.e. 5,929 tCO2e the same results to 53,369 tCO2e. 4KES audit team has verified these calculations and confirms that the values given are conservative and are devoid of any material discrepancies.

In conclusion, 4KES confirms that the input data used for calculating the Net anthropogenic GHG removals by sinks, procedures used for calculation and the results are complete and transparent. Further, audit team confirms that net anthropogenic GHG removals by sinks have been quantified correctly in accordance with the project description and applied methodology.

Uncertainties associated with the calculation of emissions

The uncertainty of the estimation of the GHG removals is calculated in line with guidance provided in the AR-TOOL14. Due to an uncertainty of 16.14 % a discount rate of 50% of the uncertainty is applied in line with Appendix 2 of AR-TOOL14.

3.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Project proponent has established a QA/QC plan and SOP which covers procedure for collecting reliable field measurements, verifying methods used to collect field data, data maintenance and archiving /17/ /24/. Audit team has checked these QA/QC procedures and confirms that it adequately addresses the procedures for rectification of any errors found while doing the data transposition and final GHG estimation. Audit team has reviewed O&M structure and confirms that roles and responsibilities related to these activities are well defined.
Further, audit team verified Excel spread sheets on 'Consolidated Calcs Data V2 - 28th Sep /03/ and the tree measurement raw data sheets /22/ and compared the information with information on measurements recorded during the field measurements, evidences submitted in the form of pictures and videos/23/ /40/. The calculation on number of sampling plots for biomass inventory /19/ as well as carbon inventory and GHG removals were assessed to determine correct application of formulae and assumptions.
The monitoring period covers from 15/06/2019 to 14/06/2020. Following are the equipment's used in the field measurement of permanent sample plots.

1. *Measuring tape and calliper for "DBH" to measure the diameter of the tree at 1.3 m. D30 or or the basal diameter (D10) is measured until the tree reaches a height beyond 1.3m.*
2. *PVC or Bamboo pole used in determining the height.*
3. *GPS for area*

It is checked except for the GPS none of the other instruments needs calibration. As per the interactions had with the field staff of WIF, the GPS is calibrated by the manufacturer before it is used by the end user and no further calibrations are required, unless there is an error in the readings. The justification provided by the PP is accepted by the verification team.

Hence, 4KES confirms that sufficient and appropriate evidence are available in order to determine the GHG reduction and removals.

3.6 Non-Permanence Risk Analysis

The proposed project 'Reforestation and Restoration of degraded mangrove lands, sustainable livelihoods and community development in Myanmar' utilized the "AFOLU Non-permanence risk tool" to assess the risk according to internal risk, external risk, natural risk, and mitigation measures for minimizing risk. At all levels, the audit team evaluated the rationale, appropriateness, and justifications of risk ratings chosen by project proponent. The findings and conclusion regarding the non-permanence risk analysis undertaken for the project are

summarized below for each risk category and factor. Unless noted otherwise, the audit team agrees with the conclusion stated in the non-permanence risk report.

The findings of the audit team regarding the risk scores applied for each factor are as follows.

1. Internal Risk

Risk Factor	*Validation Findings*	*Risk Rating*
1. Project Management (PM)		
a)	*The species identified for this reforestation project are Rhizophora mucronata, Rhizophora apiculata, Bruguiera gymnorrhiza, Bruguiera cylindrical, Bruguiera sexangula and Ceriops tagal and are naturally occurring mangrove species in Myanmar. The Audit team has checked the Species Distribution document. provided to confirm the same. No changes found since 2nd verification.*	*0*
b)	*The agreement with the village tracts will ensure sufficient staff be able to take care the plants and in this manner the encroachment of outside players that could intentionally or unintentionally damage the planted areas is avoided. Agreements with the village tract chairmen of each village provided were checked during validation visit. It was further checked that there is a continuous awareness and monitoring from the officials of forest department on the encroachment. Therefore, the score of 0 is agreed by the audit team.*	*0*
c)	*This risk is assessed as unlikely as the management team includes individuals with significant experience in skills related to successfully undertake all activities in the project. This was evident during the online interviews with the PP, where in it was confirmed that project areas are managed by a very professional team from Worldview International Foundation (WIF) which includes senior staff with experience in the management and implementation of the project and able to be done overall supervisory.* *The Audit team has checked the Project management structure to confirm the capacity and experience of the organization, hence agrees that this risk is not relevant. No changes noticed since last verification.*	*0*
d)	*As confirmed during online interviews and the previous verification reports, PP has a permanent presence in the project areas and are located in the country and able to reach the project within a 4-hour drive from the Yangon. Country office is located in the Yangon and the branch office is within the project area. Hence, the audit team agrees that this risk is not relevant. No changes noticed since last verification.*	*0*

e)	*Audit team has verified the capacity of the management team, i.e; project developer and implementer (WIF) to develop this AFOLU project, account for carbon from trees and other GHG sources, report and participate in validation and verification under respective VCS methodologies and standard requirements.* *The Carbon Consulting Company is involved in the project design and development as well as the monitoring. The team includes AFOLU carbon project development specialists for CDM, VCS and ACR projects in Southeast Asia and involved in REDD+ project design and development in the region hence have the expertise. Therefore, the score of -2 is agreed to be accepted.*	*-2*
f)	*Noted specific adaptive management plan in place. Therefore, the score of -2 is agreed to be accepted.*	*-2*
	Total Project Management (PM) [as applicable, (a + b + c + d + e + f)] Total may be less than zero.	*-4*

Risk Factor	*Validation Findings*	*Risk Rating*
2. Financial Viability (FV)		
a) *b)* *c)* *d)* *e)* *f)* *g)* *h)* *i)*	*As assessed in Section 1.2, The project implementer Worldview International Foundation (WIF) is an INGO and other partners involved are the University of Pathein and local communities from three village tracts. There is no financial return from mangrove reforestation other than the carbon credit benefits. Therefore the internal rate of return (IRR) is not applicable for this non-profit project activity hence the section 1.2 Financial Viability is not applicable for the project.* *Further, the project viability is worked out based on the carbon credit benefit only. The cash flow break even point is greater than 10 years and hence the value chosen is acceptable.*	*3*
	Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)]	*3*

Risk Factor	*Validation Findings*	*Risk Rating*
3. Opportunity Cost (OC)		

a)	*The project is reforestation and restoration of mangrove forest, with no commercial utilization of timber and thus no returns other than the carbon revenue, which is utilized for the well-being of villagers. Thus this factor is N/A.*	*N/A*

Risk Factor	*Validation Findings*	*Risk Rating*
4. Project Longevity (PL)		
a)	*The WIF has in place legally binding contracts with the University of Pathein and Village tract committees for a period of 30 years which are checked by the Audit team and clearly state that they commit to conserve the carbon stocks for the crediting period and that they will respect the project activities for the whole project's length. The contract can be further extended for another 90 years; therefore, the total project period is 120 years.* *This agreement is a legally binding commitment to continue management practices for the PP that protect the credited carbon stocks over the length of the project longevity period. Hence, it may be confirmed that the project longevity is 30 and there is a legal agreement to continue the management practices. No changes since the last verification.*	*0*
b)		*15*
	Total Project Longevity (PL) *May not be less than zero.*	*0*

2. External Risk

Risk Factor	*Validation Findings*	*Risk Rating*
1. Land Tenure and Resource Access/Impacts (LT)		

a)	*The Audit team has checked the ownership and right of use documents (Agreements between Government and the University and the Village Tract Committees of Thabawkan and Thaegone and the MoU with WIF) and confirmed that the project is implemented in Government owned lands (University of Pathein and the Village Tract Committees of Thabawkan and Thaegone), who has made agreement with the WIF for the development of mangrove reforestation/ restoration project. Therefore, both rights are held by the same entity.* *Hence a risk of two is appropriate.*	*2*
b)		
c)	*There are no disputes as the ownership is clear. Therefore, the likelihood of any dispute is very low. Moreover, the socio-economic survey conducted by WIF and University of Pathein, served as due process in order to identify any dispute as the whole villages were present in the meetings.*	*0*
d)	*As assessed above, there are no disputes over access/use rights in the project area.*	*0*
e)	*WRC projects unable to demonstrate that potential upstream and sea impacts that could undermine issued credits in the next 10 years are irrelevant or expected to be insignificant, or that there is a plan in place for effectively mitigating such impacts*	*5*
f)	*As explained in the project longevity risk this mitigation factor may be claimed by the project as the project area is protected by legally binding commitment to continue management practices that protect carbon stocks over the length of the project crediting period.*	*-2*
g)	*This has not been argued.*	*0*
	Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e + f + g)] Total may not be less than zero.	*5*

Risk Factor	*Validation Findings*	*Risk Rating*
2. Community engagement (CE)		
a)	*The Audit team has validated the evidence of stakeholder consultation meetings and Village Sensitization Process were held in three village tracts by the Project proponent and confirmed that less than 20 % households living within the project area who are reliant on the project area, have been consulted. Hence, the risk would be zero in this case.*	*0*
b)	*As assessed above less than 20 % households of the people relying on*	*0*

	the project area and whose livelihoods depend on it have been consulted. Therefore, this risk is not applicable in this case.	
c)	*As assessed above through the evidence the Audit team confirmed that the project generates net positive impacts on the social and economic well-being of the local communities who derive livelihoods from the project area. Hence the mitigation score of -5 is confirmed.*	*-5*
	Total Community Engagement (CE) [where applicable, (a + b + c)] *Total may be less than zero.*	*-5*

Risk Factor	*Validation Findings*	*Risk Rating*
3. Political Risk (PC)		
a)	*The audit team confirmed that the 5 year mean governance score for Myanmar across the six governance indicators of World Bank Institute's Worldwide Governance Indicators is -1.004. Therefore, agrees that the political risk is 6.*	*6*
b)		
c)		
d)		
e)		
f)	*The audit team checked the website of UN-REDD and confirmed that Myanmar is a partner country since December 2011. Myanmar received UN-REDD targeted support in 2013 to develop a REDD+ Readiness Roadmap and used this Roadmap to develop a funding proposal in November 2013 based on a full UN-REDD National Programme (Annex 4). Also, Myanmar has a DNA (Ministry of Environmental Conservation and Forestry). Therefore, the rating for this mitigation factors is -2. The same has not changed since last verification.*	*-2*
	Total Political (PC) [as applicable ((a, b, c, d or e) + f)] *Total may not be less than zero.*	*4*

2. Natural Risk

Risk Factor	*Validation Findings*	*Risk Rating*
F	*As assessed by the Audit team during the interviews conducted with the village committee leaders of the all the three village it is confirmed that mangroves in the Ayeyarwady Region have not been affected by any forest fire in the past.*	*0*

	Since the ecosystems where mangroves are grown are not susceptible to forest fire, the risk of fire is not applicable to the project area. Therefore, the significance of this risk is considered 'No loss' and regarding the likelihood the risk is not applicable to the project area or occurred once every 100 year or more. *Since the risk rating is 0, no mitigation activities are discussed.*	
PD	*It is confirmed that there are no reported pest attacks in the coastal mangrove area, since the last verification.* *However, there have been few pest attacks in Sonneratiaceae family and Avicenniaceae family in the delta mangrove area. There is no reported insect 'tide watching mangrove moth' Auchavelans. There are reports of some propagules and seedlings in young stage being attacked by crabs. Therefore, the significance of this risk is considered insignificant (less than 5% loss of carbon stocks) and a likelihood of less than every 10 years is confirmed.* *The project proponent has argued a mitigation factor of 0.50 which is deemed appropriate. The reason is that the staff of WIF has experience in implementing mitigation activities in order to address this risk.* *a. Training –Conducted training regarding the identification of the principal species that affect the health of the planted trees by personnel with experience in the identification of pests and diseases that harm mangroves.* *b. Monitoring – WIF is responsible for monitoring the health of the planted trees to identify the presence of pests and diseases. In addition, annual monitoring activities have been implemented.* *c. Evaluation - The incidence and severity of pests and diseases identified in the field will be determined during annual monitoring.* *Due to the implementation of these activities, a mitigation factor of 0.50 is justified.* *No changes recorded since last verification.*	*1*

W	*The W risk significance is rated as 'Major' (25% to less than 50% loss of carbon stocks), which is correct according to the audit team. Referring to scientific data and publications, it is likely that the region may affect from cyclones and other extreme weather conditions. Consequently, a likelihood of every 10 to less than 25 years is confirmed for all extreme weather events.* *The audit team assessed the project itself has the main objective of to establish and maintain a sustainably managed mangrove ecosystem for carbon sequestration, natural disaster risk reduction, poverty reduction with sustainable livelihoods in the coastal communities. Also, the Article published by Bahinipati & Sahu (2012) given by the project proponent confirm the same as the major mitigation activities in order to address this risk. Further, Darryl E. Marois &*	*2.50*

	William J. Mitsch (2015) in their review of coastal protection from tsunami and cyclones provided by mangroves highlighted the results from several numerical and physical models support the mitigating capabilities of mangroves for cyclone storm surges and small tsunamis. *Hence a mitigation factor of 0.50 is reasonable.*	
G	*According to Hazard Profile of Myanmar, 2009 the project area has not had any affects from earthquakes during the past hence this natural risk has not been considered. Therefore, Not relevant as confirmed by the audit team during the site visit.* *Hence, the significance of this risk is considered 'No loss' and regarding the likelihood the risk is not applicable to the project area or occurred once every 100 year or more.*	*0*
ON	*The other natural risk susceptible to the project area identified by the Audit team is the Tsunami. It has tsunami induced by the 2004 Sumatra Earthquake (M9.1) caused around 60 missing and dead in the delta area of southern Myanmar. It also caused USD 500 million in losses, corresponding to 1.25% of the GDP at that time. There are other records of tsunamis induced by earthquakes in 1750 and in 1930. The tsunami in 1930 affected around 500 victims in Myanmar. The significance is considered 'Devastating' (50% to less than 70% loss of carbon stocks) but regarding the likelihood the risk is not applicable to the project area or occurred once every 100 year or more.* *Since the risk rating is 0, no mitigation activities are discussed.*	*0*
	Total Natural Risk (as applicable, F + PD + W + G + ON)	*3.50*

The overall non-permanence risk rating that was determined for the project, using below Table is 7.50.

Risk Category	*Rating*
a) Internal Risk	*0.00*
b) External Risk	*4.00*
c) Natural Risk	*3.50*
Overall Risk Rating (a + b + c)	***10***

However, in accordance with the VCS Non-Permanence Risk Tool, the overall score shall be rounded up to the nearest whole percentage, and the minimum risk rating shall be 10, regardless of the risk rating calculated. Therefore, 10% is the overall risk rating for this project.

In summary, the overall risk rating that was determined for the project, in accordance with the VCS Non-Permanence Risk Tool, is 10%. The audit team has concluded that the above risk rating is in conformance with the VCS rules.

Thus, 4KES audit team confirmed that the non-permanence assessment has been carried out adequately by applying the conservative assumptions. Therefore, the total buffer credits foreseen in the proposed project activity are: Buffer credits = 59,299 x 10% = 5,929 tCO_2e for the current monitoring period.

4 VERIFICATION CONCLUSION

4KES has performed verification of the emission reductions reported for the project activity "Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar", VCS Registration Reference No. 1764, for the period 15/06/2019 to 14/06/2020, with regard to the relevant requirements for VCS rules (VCS Standard, v4.0 issued on 19/09/2019 and updated on 09/03/2020, VCS Program Guide, v4.0 issued on 19/09/2019).

The owner of the project is Worldview International Foundation (WIF), who is responsible for:

- *The preparation of greenhouses gas emissions data and the reported greenhouse gas emission reductions from the project on the basis set out in the monitoring plan contained in the registered VCS-PD, version 3.0 dated 19/02/2018*

- *The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of greenhouse gas emission reductions of the project*

It is the responsibility of 4KES to express an independent verification opinion about the project's conformity with the VCS requirements and procedures and on the reported greenhouse gas emission reductions from the project.

Based on documented evidence and corroborated by an off-site assessment 4KES can confirm that:

- *The project has been implemented and operated as per the registered VCS-PD;*

- *The monitoring plan in the registered VCS-PD is as per the applied baseline and monitoring methodology.*

- *The monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS requirements;*

It is 4KES's opinion that the GHG emission reduction stated in the VCS monitoring report version 2.0 of 29/09/2020 for the "Reforestation and Restoration of degraded mangrove lands, sustainable livelihood and community development in Myanmar" for the period 15/06/2019 to 14/06/2020 has been fairly stated. The GHG emission reductions were calculated correctly on

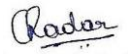
the basis A/R Large-scale Methodology: Afforestation and reforestation of degraded mangrove habitats (AR AM0014) Version 03.0.

Verification period: From [15-June-2019] to [14-June- 2020]

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)	Buffer pool allocation	VCUs eligible for issuance
15/06/2019-14/06/2020	0	0	0	59,299	5,929	53,369
Total	0	0	0	59,299	5,929	53,369

Approved by



Chandrakala R.

Director

4K Earth Science Private Limited

Date: 28-Oct-2020

Place: Bangalore, India

APPENDIX 1: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUESTS

Table 1. Remaining FAR from validation and/or previous verifications

FAR ID	N/A	**Section no.**	2.5.1	**Date:** 21/09/2020
Description of FAR				
For the future monitoring it has to be ensured, that the self-imposed QA/QC requirements of remeasuring 20% of the sample plots is fulfilled.				
Project participant response				**Date:** 29/09/2020
Project proponent is ensuring this is followed. For the last verification, field manager conducted 100% resampling to ensure the validity of the data.				
Documentation provided by project participant				
Field measurement sheets which are certified by the field manager – Scanned copies of Raw Data sheets have already been provided				
DOE assessment				**Date:** 07/10/2020
The verification team checked the field measurement data sheets, which confirms that there is a cross check from the field manager, and this was not only for 20% samples but for all the samples. The same was also confirmed by interacting with the field manager and project manager. Thus, the FAR is closed.				

Table 2. CAR from this verification

CAR ID	CAR1	Section no.	2.9	Date: 21/09/2020
Description of CAR				
As per the registered PD, the total area to be planted in 2019-2020 is 379.57 ha. However, as per the Monitoring Report, the area planted in the proposed monitoring period (2019) is 1147.14 ha. PP is requested to clarify the inconsistency and clarify that this change doesn't impact the silvicultural operations. It is further checked from the previous verification report that 36.56 ha of the project area had been encroached, which is now not part of the project activity anymore. However, the same is not transparent in the MR.				
Project participant response				Date: 29/09/2020

During the previous monitoring year, due to lack of funding, planting material and staffing issues, it was not possible to undertake the planned planting as mentioned in the 2019 Monitoring Report. This year, PP was able to mobilize the necessary funds, planting material and staff and decided to scale up the planting to complete planting of the intended area. The revised planted area for this monitoring period is 1,108.24 ha and has been reflected in the updated Calculation sheets as well as the Monitoring Report. An area of 3.30 ha was excluded from the project. Before the planting started and during the project, the project team assessed the lands. Again, during the planting operation, the field team assessed the lands for planting. If there are any areas not suitable for planting as deemed by the team, such areas will be left alone. For example, an area of 35.54 ha of shrimp ponds were not planted in Magyi. Similarly, an area of 3.30 ha was excluded from the project because the areas were determined to not be plantable during the 2019 planting, and no planting will occur in that area in the future. The team informed their decision to WIF HQ and confirmed that this area will not be planted in the future. The updated areas are provided in the maps already submitted. Staff is well experienced with 30 years of field work experience, and the decision was taken in consultation with field management and it as discussed and implemented such that if will not impact silviculture operations. This has been reflected in the updated MR in Section 2.3.2.

Since the area of 36.56 ha was already identified and removed by the previous auditor due to the construction of a hotel, this area was not included in the total area given in this MR. Since it was specified in the previous MR, it was not mentioned again. However, a statement regarding this, as well as other project deviations as identified in the 2018 MR and this year, has been included in the updated MR in Section 2.3.2.

Documentation provided by project participant

Updated Monitoring Report (Folder Title - Project ID 1764 - Updated MR and Calcs)

2019 Planting Area Maps (Folder Title - 2. & 11. Project Boundary maps)

DOE assessment	**Date:** 07/10/2020

As per the registered VCS-PD, the project will be implemented on 2146.48 hectares, which covers 1607.81 ha of area to be planted and 538.67 ha of area to be restored. The planting activities planned for these areas are from 2015 to 2020. However, as per the previous verifications i.e. the first and 2nd verification an area of 72.12 was excluded due to various reasons, which was verified and concluded in the previous verifications /38/ /39/ and in the proposed verification an area of 3.30 ha was excluded. The field team identified these areas as not suitable for planting. The report of the same was communicated to WIF HO, which was accepted to exclude these areas from planting. Revised project boundary file "2019 Planting Area Maps" checked and accepted by the validation team. Thus, the total area covered under the project activity is only 2071.06.

Table3. CL from this verification

CL ID	01	Section no.	3.4	Date: 21/09/2020
Description of CL				
The verification team checked the ER calculations and noted the following: 1. *Uncertainty calculations as per the guidance of provided in the AR-Tool 14 is not transparent in the ER spread sheets.* 2. *PP is requested to provide consolidated spread sheets of the ER calculations.* 3. *The ER spread sheets "VCUs for 2015-2017 plantations, sheet -growth data is not transparent on the no. of trees planted in 2019 and their survival rate in 2020. It is further observed that for the plot 19 of 2018 plantation, there is an increase in the no. of trees from 76 to 94. PP is requested to clarify and provide data sheets for the same.* 4. *It is further checked that the survival rate is calculated based on the number plants survived since last verification. PP is requested to clarify appropriateness of the same.* 5. *Noted that the DBH, height and the no. of trees /ha are hard punched values and not linked to the field data sheets.* 6. *The MR is not transparent on the values of carbon stock change in above ground, below ground and SoC values.* 7. *The excel sheet "VCU-2019 plantations", under the sheet "area plant", the strata mentioned in i4. However, the same has to be i5. Also, the ratio of strata is w5 and not w4.* 8. *The team checked the DBH and Height values used in the ER calculations with raw data sheets. Noted that that the trees above 1.3 m, the DBH readings noted was at 1.3. The same is as per the registered PDD. However, the ER sheets uses the values, the same as previous verification. PP is requested to clarify and justify the conservativeness of selecting these values.* 9. *The ER spread sheets not transparent on the time period elapsed between two successive estimations of carbon stock in a carbon pool.*				
Project participant response				Date: 29/09/2020

1. *Uncertainty calculations have been undertaken and this has been reflected in the Consolidated Calcs Data sheet as well as the updated Monitoring Report under Section 5.2 on page 46 and 47.* 2. *Consolidated and linked spreadsheet has been developed.* 3. *Revised version reflects the correct values for growth data.* 4. *This has been the standard procedure since project initiation and during the first and second verifications, this was accepted, and therefore continued the same.* 5. *All sheets have been updated to ensure values are linked and not hard punched.* 6. *The MR was revised to reflect the values of carbon stock change in above ground, below ground and SoC values.* 7. *Sheet has been updated.* 8. *This has been revised using the latest DBH as per the raw data sheets.* 9. *The time period elapsed between two successive estimations of carbon stock in a carbon pool is one year. This has been reflected in the revised ER sheets (i.e. years have been changed to indicate the time period)*
Documentation provided by project participant
Revised Measurements of Sample Plots sheet, Measurement Summary – Averages sheet, ER sheets, Consolidated Calcs Data sheet, Updated Monitoring Report *(Folder title - Project ID 1764 - Updated MR and Calcs)*

DOE assessment	**Date:** 07/10/2020

1. Uncertainty calculations have been addressed in the *Consolidated Calcs Data sheet and the same has also been made transparent in the revised MR.*

2. Consolidated spread sheets for the proposed monitoring period is provided and the same is accepted.

3. The no. of trees planted in 2019 and their survival rate has been made transparent in the revised calculation sheets. The same was also cross checked with the field measurement data sheet and confirmed to be appropriate. The team also cross checked the plant inventory of stock in and stock out and the no. of purchases made and the same was found to be acceptable.

4. The team accepts the justification provided by the PP. It was also checked that the dead trees were always replaced with new trees in the first three years of the plantation.

5. The field measurement data sheets are now linked to the ER sheets.

6. The revised MR is now transparent on the calculations and the values arrived for carbon stock change in above ground, below ground and SoC values.

7.The strata identification has been revised in the excel sheet "VCU-2019 plantations", which is now acceptable.

8. The ER sheets are revised with the DBH values arrived at 1.3 m. The same was cross checked with the raw data sheets and found to be acceptable.

9. Time period elapsed between two successive estimations of carbon stock in a carbon pool is one year and the same has been made transparent in the revised ER sheets, which is acceptable to the team.

Based on the above-mentioned justifications, CL1 is closed.

CL ID	02	Section no.	3.6	Date: 21/09/2020
Description of CL				
PP to clarify the latest references for the documents Annex-3, Annex-5 and Annex-7. *Provide translated document of Annex-10.*				
Project participant response				Date: 29/09/2020

Annex 3 is an updated document while Annex 5 and Annex 7 are publications that do not have any updates. *The translated document has been provided.*
Documentation provided by project participant
Translated document for Annex 10 (Folder title - Project ID 1764 - Updated MR and Calcs)

DOE assessment	**Date:** 07/10/2020
1. It is been clarified that Annex-3 has been updated. However, Annex-5 and Annex-7 still remains the same. The same was checked and accepted by the team. 2. Translated document of Annex-10 has been provided. Based on the above justification, CL02 is closed.	

Table-4: FAR from this verification.

FAR ID	01	**Section no.**	2.5.1	**Date:** 21/09/2020
Description of FAR				
As per the registered VCS-PD and validation report, it is noted that for the ex-ante estimation of SOC pool, PP has used site specific value for $dSOC_t$ derived from field-based data. PP has used a soil carbon accumulation rate of 7.32 tc/ha/yr for ex-ante estimation of changes in carbon stock in soil organic carbon, which is fixed ex-ante for 20 years. The same was also accepted in the first and 2nd verification. However, as per paragraph, 3.2.5 of Validation and Verification manual, ver 3.2, in order to ascertain the validity of the data or parameter provided by PP, it shall be sourced from relevant peer-reviewed journals/literature. The same was applied to the project activity. However, the verification team is of the opinion that SOC is a data/parameter, which can influence the emission reductions as following: 1. *Implementation of an A/R CDM project activity increases the SOC content of the lands from the pre-project level to the level that is equal to the steady-state SOC content under native vegetation;* 2. *The increase in SOC content in the project scenario takes place at a constant rate over a period of 20 years from the year of planting.* *Thus, the verification team is of the opinion that SOC needs to be monitored over a period of time. PP is requested clarify the same.*				
Project participant response				**Date:** 29/09/2020
PP will conduct another soil sample test in the year 2022 to verify the value obtained from the first test, and will be provided at the 2022 verification.				

Documentation provided by project participant	
DOE assessment	**Date:** DD/MM/YYYY

APPENDIX 2: COMPETENCE OF TEAM MEMBERS

<table>
<tr><td colspan="8"><u>Certificate of Competence</u></td></tr>
<tr><td>Name</td><td>☐ Mr.
☒ Ms.</td><td colspan="6">Rekha Menon</td></tr>
<tr><td colspan="2">Qualification Procedure</td><td colspan="6">Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.</td></tr>
<tr><td colspan="8">Appointed to work as:</td></tr>
<tr><td></td><td colspan="2">CDM Validator/Verifier</td><td>Team Leader</td><td>Team Member</td><td>Technical Expert</td><td>Technical Reviewer</td><td>Financial Expert</td></tr>
<tr><td>Appointed</td><td colspan="2">Yes</td><td>Yes</td><td>Yes</td><td>Yes</td><td>Yes</td><td>No</td></tr>
<tr><td>Appointed Date</td><td colspan="7">01-10-2019</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td colspan="8">Authorized to work as Technical Expert for:</td></tr>
<tr><td rowspan="6">Authorized Technical Area</td><td colspan="3">Sectoral Scope</td><td>TA Code</td><td colspan="3">Technical Area within the scope</td></tr>
<tr><td colspan="3">Energy industries (renewable - / non-renewable sources)</td><td>1.1</td><td colspan="3">Thermal energy generation</td></tr>
<tr><td colspan="3">Energy industries (renewable - / non-renewable sources)</td><td>1.2</td><td colspan="3">Renewables</td></tr>
<tr><td colspan="3">Energy demand</td><td>3.1</td><td colspan="3">Energy demand</td></tr>
<tr><td colspan="3">Waste handling and disposal</td><td>13.1</td><td colspan="3">Solid waste and wastewater</td></tr>
<tr><td colspan="3">Afforestation and reforestation</td><td>14.1</td><td colspan="3">Afforestation and reforestation</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td colspan="8">Authorized to work as Local Expert for:</td></tr>
</table>

Country/Countries	India, Myanmar, Sri Lanka
Compliance check by: Anand S. R.	

Certificate of Competence

Name	☒ Mr. ☐ Ms.	**Ma Paa Puratchikkanal**
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*

Appointed to work as:

	CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed	Yes	Yes	Yes	Yes	Yes	No
Appointed Date	29-07-2019					

Authorized to work as Technical Expert for:

	Sectoral Scope	**TA Code**	**Technical Area within the scope**
Authorized Technical Area	Energy industries (renewable - / non-renewable sources)	1.1	Thermal energy generation
	Energy industries (renewable - / non-renewable sources)	1.2	Renewables
	Energy demand	3.1	Energy demand
	Construction	6.1	Construction
	Waste handling and disposal	13.1	Solid waste and wastewater
	Agriculture	15.1	Agriculture

Authorized to work as Local Expert for:	
Country/Countries	India
Compliance check by: Anand S. R.	

Certificate of Competence

Name	☐ Mr. ☒ Ms.	**Sudha Padmanabha**
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*

Appointed to work as:

	CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed	No	No	No	Yes	No	No
Appointed Date	01-08-2019					

Authorized to work as Technical Expert for:

Authorized Technical Area	Afforestation and reforestation	14.1	Afforestation and reforestation

Authorized to work as Local Expert for:

Country/Countries	India
Compliance check by: Anand S.R.	