Project Verification Report

2021

COVER PAGE Project Verification Report Form (VR)	
Complete this form in accordance with the instructions.	
BASIC INFORMATION	
Name of approved UCR Project Verifier / Reference No.	VKU Certification Pvt. Ltd.
Type of Accreditation	☐CDM or other GHG ☒ Accreditation ISO 14065 Accreditation ☒ UCR Approved Verifier Name of the entity that provided the accreditation – ANAB (ANSI National Accreditation Board Date of validity (15/03/2022 to 15/03/2027)
Approved UCR Scopes and GHG Sectoral scopes for Project Verification	Sectoral Scope: 04 (Manufacturing Industries)
Validity of UCR approval of Verifier	12/07/2022 to 15/03/2027
Completion date of this VR	17/05/2025
Title of the project activity	AAC block project by Starbigbloc Building Material Limited
Project reference no. (as provided by UCR Program)	527
Name of Entity requesting verification service (can be Project Owners themselves or any Entity having authorization of Project Owners, example aggregator.)	**Project Owner** - Starbigbloc Building Material Limited

Contact details of the representative of the Entity, requesting verification service (Focal Point assigned for all communications)	**Project Owner Name** - Starbigbloc Building Material Limited **Contact Person**: Manish Saboo **Contact Number**: 9825161000 **Email id** - manish.saboo@nxtbloc.in **HO Address**: 908, Rajhans Montessa, Dumas Road, Magdalla, Surat-395007, Gujarat
Country where project is located	India
Applied methodologies (approved methodologies by UCR Standard used)	AMS-III.Z.: "Fuel Switch, process improvement and energy efficiency in brick manufacture", Version 06.0
GHG Sectoral scopes linked to the applied methodologies	Sectoral Scope: 04 (Manufacturing Industries)
Project Verification Criteria: Mandatory requirements to be assessed	☒ UCR Standard ☒ Applicable Approved Methodology ☒ Applicable Legal requirements /rules of host country ☒ Eligibility of the Project Type ☒ Start date of the Project activity ☒ Meet applicability conditions in the applied methodology ☒ Credible Baseline ☒ Do No Harm Test ☒ Emission Reduction calculations ☒ Monitoring Report ☒ No GHG Double Counting ☐ Others (please mention below)
Project Verification Criteria: Optional requirements to be assessed	☒ Environmental Safeguards Standard and do-no-harm criteria ☒ Social Safeguards Standard do-no-harm criteria

Project Verifier's Confirmation: The *UCR Project Verifier* has verified the UCR project activity and therefore confirms the following:	The UCR Project Verifier **VKU Certification Private Limited**, certifies the following with respect to the UCR Project Activity **AAC block project by Starbigbloc Building Material Limited**. ☒ The Project Owner has correctly described the Project Activity in the Project Concept Note (dated 23/04/2025) including the applicability of the approved methodology [Applied Baseline Methodology: AMS-III.Z.: "Fuel Switch, process improvement and energy efficiency in brick manufacture", Version 06.0,] and meets the methodology applicability conditions and has achieved the estimated GHG emission reductions, complies with the monitoring methodology and has calculated emission reductions estimates correctly and conservatively. ☒ The Project Activity is likely to generate GHG emission reductions amounting to the 2,24,282 tCO_{2e} (Actual during current Monitoring period) and estimated 2,50,431 tCO_{2e}[1], as indicated in the PCN, which are additional to the reductions that are likely to occur in absence of the Project Activity and complies with all applicable UCR rules, including ISO 14064-2 and ISO 14064-3. ☒ The Project Activity is not likely to cause any net-harm to the environment and/or society ☒ The Project Activity complies with all the applicable UCR rules[2] and therefore recommends UCR Program to register the Project activity with above mentioned labels.

[1] As per registered PCN

Project Verification Report, reference number and date of approval	**Verification Report UCR** • UCR ID: 527 • Reference No: VKU.VER.01.25_UCR_527 • Version: 1.1 • Date: 17/05/2025
Name of the authorised personnel of UCR Project Verifier and his/her signature with date	VIKAS KUMAR AHARWAL Digitally signed by VIKAS KUMAR AHARWAL Date: 2025.05.18 17:36:25 +05'30' Vikas Kumar Aharwal (Director) Date: 18/05/2025

PROJECT VERIFICATION REPORT

Section A. Executive summary

VKU Certification Pvt. Ltd. (here after referred as VKU) has been contracted by project owner i.e. Starbigbloc Building Material Limited (here after referred as PP). VKU, has verified greenhouse gas emission reductions reported for the project activity “AAC block project by Starbigbloc Building Material Limited. (UCR ID 527) for the period 20-February-2018 to 31-December-2024 (Inclusive of both start and end dates) with regard to the relevant requirements for UCR Standard version 7 dated Aug 2024 /03/

The total GHG emission reductions over the crediting / verification period stated in the Monitoring Report (MR) /8/, submitted are found to be correct and in line with the UCR guidelines. The GHG emission reductions were calculated on the basis of UCR guideline which draws reference from the standard baseline, AMS-III.Z – “Fuel Switch, process improvement and energy efficiency in brick manufacture”, Version 06.0./5/ The verification was conducted by onsite inspection of the plant and checking the supporting documents for verification by PO.

It is certified that the emission reductions from the AAC block project by Starbigbloc Building Material Limited. (UCR ID – 527) for the period 20/02/2018 to 31/12/2024 amounts to 2,24,282 CoUs (2,24,282tCO2e).

Scope

The scope of the verification is the independent, objective review and ex-post determination of the monitored reductions in GHG emission by the AAC block project by Starbigbloc Building Material Limited” (UCR ID 527) in India for the period from 20/02/2018 to 31/12/2024 (Inclusive of both start and end dates).

- To verify the project implementation and operation with respect to the registered PCN/10/.
- To verify the implemented monitoring plan with the registered PCN/10/ applied baseline and monitoring methodology/5/.
- To assess the project’s compliance with other relevant rules including the host country legislation
- 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.
- 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 confirm that the monitoring system is implemented and fully functional to generate COUs without any double counting and Agreement stating assurance to avoid double accounting for the project to be verified, along with required proof.
- To verify that reported GHG emission data is sufficiently supported by evidence.
- The project is assessed against the requirements of the UCR Program Manual/1/, UCR CoU Standard/2/ and UCR verification standard/3/, ISO 14064-2:2019.

Due professional care has been exercised and ethical conduct has been followed by the assessment team during the verification process. The verification report is a fair presentation of the verification activity. The validation of the project is not part of the present assignment and project is deemed validated post-registration by UCR.

The verification is not meant to provide any consulting towards the project participant/Project owner (PP/PO). However, stated requests for clarification and corrective actions may have provided inputs for improvement of the project design.

Description of the project

Starbigbloc Building Material Limited, the project proponent, is engaged in the manufacturing of Autoclaved Aerated Concrete (AAC) blocks at its facility located in Savli village, Kheda district, Gujarat, India. AAC Blocks are a sustainable alternative to traditional red clay bricks. These blocks are produced using fly ash, cement, lime, aluminum powder, and water, undergoing a chemical reaction and high-pressure steam curing (autoclaving), resulting in lightweight, durable building material with excellent insulation properties. The project is a small- scale activity and verification team could confirm it by review of registered PCN /10/ and through onsite inspection.

The objective of the project activity is to reduce greenhouse gas emissions by replacing conventional, carbon-intensive red clay bricks with energy-efficient and environmentally sustainable Autoclaved Aerated Concrete (AAC) blocks. This transition not only avoids emissions associated with coal combustion in traditional brick kilns but also contributes to the conservation of topsoil, which is otherwise extensively used in red clay brick manufacturing. Additionally, the project promotes the utilization of industrial by-products such as fly ash, thereby supporting waste reduction and resource efficiency.

The plant is owned by Starbigbloc Building Material Limited, a wholly owned subsidiary of Bigbloc Construction Ltd., one of India's leading AAC block manufacturers with over 13 years of experience. The facility is state-of-the-art, using modern equipment and fully automated processes to ensure quality, efficiency, and compliance with green building norms.

The installed capacity is approximately 2,50,000 cubic meters per annum of AAC blocks which includes sand based AAC.These blocks are marketed under the "NXTBloc" brand and serve a range of infrastructure sectors including residential, commercial, and industrial projects. And it has been verified via ER calculation sheet, supporting documents /11//18/ and during the onsite visit/29/.

The product's technical specifications have been verified during the onsite visit through the product catalogue /18/, as outlined below:

Sr. No.	Parameters	Specification
1	Appearance	Grey Powder
2	Maximum Aggregate Size	< 3 mm
3	Bulk Density	1.5 - 1.6 kg/l
4	Compressive Strength (28 days)	> 9 N/mm²
5	Flexural Strength (28 days)	Min. 1.8 N/mm²
6	Water Retentivity	Min. 95% (EN 1015-8)
7	Coverage	16–18 sq. ft (10–12 mm Thickness)
8	Thickness of Layer	~12 mm
9	Pot Life	1.5 – 2 hours
10	Proportion of Water	17–19% (as per weight)

As mentioned in the monitoring report /8/ and emission reduction calculation sheet/9/ submitted for verification, the project replaces anthropogenic emissions of greenhouse gases (GHGs) 2,24,282 tCO2e for the said period under verification.

The project activity focuses on manufacturing Aerated Autoclaved Concrete (AAC) blocks, which offer numerous advantages. These blocks have impressive compressive strength, are lightweight, easy to construct and economically viable for transportation. By employing this method as a substitute for traditional bricks produced in kilns, which are CO2-intensive, the project proponent aims to reduce greenhouse gas emissions. By adopting this low-carbon technology, the project contributes to decreasing emissions and promoting a cleaner environment.

The project is a small-scale activity. The methodology applied in the monitoring report is verified against the AMS-III. Z, "Fuel Switch, process improvement and energy efficiency in brick manufacture", Version 06.0/5/ Verified total emission reduction (ERs) achieved through the project activity during the monitoring period is summarised below:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Project start date	20/02/2018
Start date of this Monitoring Period	20/02/2018
Carbon credits claimed up to	31/12/2024
Baseline Emission	4,72,929 tCO_{2eq}
Leakage Emission	1,52,440 tCO_{2eq}
Project Emission	96,207 tCO_{2eq}
Total ERs generated (tCO2e)	2,24,282 tCO_{2eq}

Section B. Project Verification team, technical reviewer and approver

Project Verification team

No.	**Role**	**Last name**	**First name**	**Affiliation** (e.g. name of central or other office of UCR Project Verifier or outsourced entity)	**Involvement in**		
					Doc review	**Off-Site inspection**	**Interviews**
1.	Team Leader cum Technical Expert (TA 4.1)	Kathuria	Sunil	Outsourced entity	Yes	yes	Yes
2.	Validator Verifier Trainee	Bhana	Sanjana	VKU certification Pvt. Ltd.	Yes	yes	No

Technical reviewer and approver of the Project Verification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of UCR Project Verifier or outsourced entity)
1.	Technical Reviewer	External resource	Joshi	Akhilesh	Outsourced entity
2.	Approver	Internal resource	Aharwal	Vikas Kumar	VKU Certification Pvt. Ltd.

Section C. Means of Project Verification

C.1 Desk/document review

VKU Certification conducted a desk review which is as follows;

During the document review, VKU has applied standard auditing techniques to assess the quality of information provided. The verification has been performed primarily based on the review of monitoring report (MR) /8/ and emission reduction (ER) calculations spreadsheet /9/ were received from PP/PO and assessed along with the monitoring reports as part of the verification. In addition, the registered PCN version 1.0 of 23/04/2025 /10/ have been also reviewed, for the baseline estimations and applicability of the monitoring plan.
As per section 2 of the UCR Verification standard version 2.0 dated 08/2022 /3/ In carrying out UCR Project Verifications, UCR Verifiers shall review any other data, information and references relevant to the GHG emission reductions or net anthropogenic GHG removals resulting from the registered UCR Project Activity.

In addition to the monitoring documentation, VKU Certification has reviewed;

- The UCR PCN version 1.0 of 23/04/2025 /10/ and the monitoring plan, including any approved revised monitoring plan and/or changes from the registered PCN.
- The applied monitoring methodology AMS-III.Z.: “Fuel Switch, process improvement and energy efficiency in brick manufacture”, Version 06.0 /5/ and, where applicable, the applied standardized baseline
- The monitoring report (all versions) to verify that it is as per the standardized format;

Any other information and references relevant to the project activity’s emission reductions.
The complete list of documents reviewed is included under in this report under Appendix 3 “document reviewed and reference” in this report.

The desk review was conducted by the verification team that included:

- A review of data and information presented to assess its completeness
- A review of the initial PCN/10/, MR/8/, emission reduction calculation sheet/9/, Methodology – AMS-III.Z/5/.

The list of submitted documents is available in a subsequent section of this verification report under the appendix - 3

C.2 On-site inspection

Date of onsite inspection: 06/05/2025			
No.	**Activity performed Off-Site**	**Site location**	**Date**
1.	Opening meeting has been conducted in accordance with clause 6.4.3 of ISO 19011:2018	Village: Savli District: Kheda State: Gujrat Country: India	06/05/2025
2.	An assessment of the implementation and operation of the UCR project activity as per the PCN • Evidence gathering at Raw material handling & mixing, Boiler section, Autoclave section, Curing & Moulding section, D.G. sets and Energy meter, Transportation and Packaging section • A review of information flows for generating, aggregating and reporting of the monitoring parameters. • Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the Monitoring Plan • A cross-check between information provided in the MR and data from other sources • A check of the monitoring equipment and observations of monitoring practices against the requirements of the registered PCN and the applied methodology • A review of calculations and assumptions made in determining the GHG data and ERs, and • An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the monitoring parameters		
3	Closing meeting has been conducted in accordance with the clause 6.4.10 of ISO 19011:2018		

C.3 Interviews

No.	Interview			Date	Subject
	Last name	First name	Affiliation & gender		
1.	Dhoot	Tejas	Sr Engineer	06/05/2025	• An assessment of the legal ownership, start date, crediting period and implementation and operation of the UCR project activity as per the PCN • Raw material handling & transport • A review of information flows for generating, aggregating and reporting of the monitoring parameters. • Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the Monitoring Plan. • A cross-check between information provided in the MR and data from other sources • A check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the PDD and the applied methodology. • A review of calculations and assumptions made in determining the GHG data and ERs. • Environmental & social benefits due to the project activity • Suggestion box/ grievance mechanism • An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters.
2.	Kumar	Kundan	Plant Head		
3.	Mistry	Ami	Sr. Executive (operations) CDPL		
4.	Patel	Bhavi	Executive (Operations) CDPL		
5.	Kanani	Dhvani	Assistant Manager CDPL		
6.	Kumar	Drirendra	Guard		
7.	Pagi	Bharat	Local stakeholder		
8.	Yadav	Yogendra	Boiler Operator		
9.	Ram	Jai	Lab Incharge		
10.	Pandey	Ankit	Production Manager		
11.	-	Gopal	Villager (Male stakeholder)		
12.	Patel	Tejas	Villager (Male stakeholder)		
13.	-	Kamita	Villager (female stakeholder)		
14.	-	Kamut	Villager (female stakeholder)		

C.4. Sampling approach

This section is not applicable as no sampling is involved and 100% data is verified by VVB

C.5. Clarification request (CLs), corrective action request (CARs) and forward action request (FARs) raised

Areas of Project Verification findings	No. of CL	No. of CAR	No. of FAR
Green House Gas (GHG)			
Identification and Eligibility of project type	NIL	NIL	NIL
General description of project activity	NIL	NIL	NIL
Application and selection of methodologies and standardized baselines	NIL	NIL	NIL
- Application of methodologies and standardized baselines	NIL	NIL	NIL
- Deviation from methodology and/or methodological tool	NIL	NIL	NIL
- Clarification on applicability of methodology, tool and/or standardized baseline	NIL	CAR 3	NIL
- Project boundary, sources and GHGs	NIL	NIL	NIL
- Baseline scenario	NIL	NIL	NIL
- Estimation of emission reductions or net anthropogenic removals	NIL	CAR 03	
- Monitoring Report	CL 1	CAR 2	
Start date, crediting period and duration	CL 1	00	00
Environmental impacts	NIL	NIL	NIL
Project Owner- Identification and communication	NIL	NIL	NIL
Others (No Double Counting)	CL 1		
Total[3]	1 CL	2 CAR	00 FAR

[3] Total Findings raised = 4 (2 CL & 2 CAR) refer Appendix - 4 of this report

Section D. Project Verification findings

D.1. Identification and eligibility of project type

Means of Project Verification	The project is eligible as per UCR General project eligibility criteria which is acceptable since the project has not been registered under any GHG program and the operations started since 20/02/2018 which is the start date of the project activity under Star Bigbloc's management has been considered as the date of the first invoice issued on 20/02/2018 by Star Bigbloc Building Materials Pvt Ltd. Prior to the commencement of the project activity, the project owner obtained Factory license from Director Industrial Safety & Health Gujarat state /17/ additionally consent -AWH /19/ has been checked for the operation of manufacturing activity from Gujarat Pollution Control Board (GPCB). The project's production capacity for AAC blocks, as per the registered PCN, is 250,000 cubic meters per annum. This was verified during the onsite visit through a review of the AAC block production data generated on Microsoft dynamics 365 Business Central /12/ for the current monitoring period and the ER sheet /9/. It was confirmed that the annual production remains within the specified limit of 250,000 cubic meters. Project applies an approved CDM monitoring and baseline methodology AMS-III.Z Fuel Switch, process improvement and energy efficiency in brick manufacture, Version 06.0/5/. The project is eligible as per the requirements of the UCR General project eligibility criteria and guidance Version 06.0./2/ Further project verification team cross checked the other GHG programmes like Clean Development Mechanism (CDM) Registry, VERRA Registry, Gold Standard (GS) Registry The project's exclusive registration under UCR for the current monitoring period, along with its absence from rejection lists of other GHG programs, has been comprehensively verified, ensuring the integrity and credibility of its GHG benefits claims. Details of the registries checked are as follows: • http://cdm.unfccc.int/ • Verra Search Page • https://cri.nccf.in/ • International Carbon Registry - International Carbon Registry • GCC PROJECTS PORTAL (globalcarboncouncil.com) • https://biocarbonregistry.com/en/projects/ • https://wilder.earth/social_carbon • https://www.ecoregistry.io/

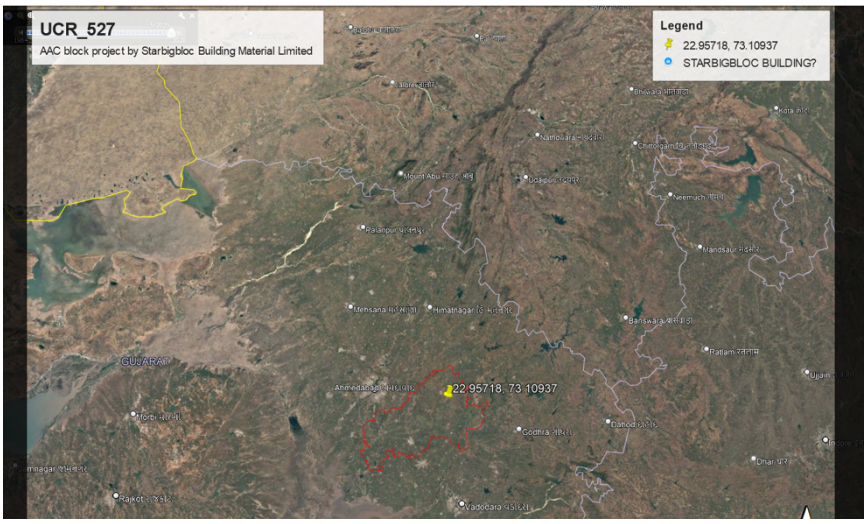
	• https://www.carbonregistry.com/explore/projects • https://wilder.earth/social_carbon • https://www.recregistryindia.nic.in/ • https://www.ecoregistry.io/ • https://www.ecohz.com/wiki/what-is-an-energy-attribute-certificate-eac It is confirmed that the project was not submitted or registered under any other GHG programmes and non-voluntary non-GHG Programs, GPS coordinates, Legal Ownership of the Project activity is not submitted or registered under any other GHG programmes and non-voluntary non-GHG Programs.
Findings	No findings are raised in this regard
Conclusion	The project activity meets the UCR General Project Eligibility Criteria and is confirmed to be exclusively registered under UCR. It commenced operations under Star Bigbloc Building Materials Pvt. Ltd. on 20/02/2018, with valid consents and licenses verified. Production capacity remains within the approved 250,000 m³/year, and the applied CDM methodology AMS-III.Z (Version 06.0) is appropriate. Cross-checks against major GHG registries confirm the project is not registered or submitted elsewhere. No risks of double counting were identified and it aligns with the registered PCN /10/

D.2. General description of project activity

Means of Project Verification	The project is focused on the production of Autoclaved Aerated Concrete (AAC) blocks, which serve as a sustainable alternative to conventional red clay bricks. These blocks are manufactured using a mixture of fly ash, cement, lime, aluminium powder, and water. The mixture undergoes a chemical reaction followed by high-pressure steam curing (autoclaving), resulting in a lightweight, durable material with superior thermal insulation properties. During the onsite verification visit, the manufacturing process was directly observed and crosschecked with the manufacturing process document /34/ and confirmed through discussions with site personnel via interviewing them /33/. The operational practices and process flow were found to be consistent with the described methodology, thereby confirming the implementation of AAC block production as reported. The main objective of the project is to reduce greenhouse gas emissions by displacing carbon-intensive red clay bricks with energy-efficient and eco-friendly AAC blocks. This shift leads to: • Avoidance of emissions associated with coal combustion in brick kilns • Conservation of topsoil used in traditional brick manufacturing. • Utilization of industrial by-products (fly ash), reducing waste. Ownership of the project activity has been verified through the review of the factory license /17/ and relevant No Objection Certificates (NOCs)/approvals issued by the concerned government authority /18//19/. This assessment further corroborated through interviews conducted with key personnel during the onsite visit /33/ . The AAC Block project was initially commissioned and implemented by Hilltop Concrete Private Limited in the year 2016. The plant was established for the manufacturing of Autoclaved Aerated Concrete (AAC) blocks using a mix of cement, fly ash, sand, water, lime, and aluminum powder. In the year 2018, the plant was officially taken over by Bigbloc Construction Ltd., and the ownership of the AAC Block facility was transferred. Post-acquisition, the ownership was transferred under the name of Star Bigbloc Building Material Limited which undertook several modifications and upgrades in plant operations, machinery, and internal systems to improve the overall efficiency. These changes were implemented while maintaining the core technology and process of AAC block manufacturing as originally designed. Given the change in ownership and operational restructuring, the start date of the project activity under Star Bigbloc's management has been considered as the date of the first invoice issued on 20th Feb 2018 by Star Bigbloc Building Materials Pvt Ltd. This date reflects the initiation of operations under the current ownership structure and serves as the basis for crediting and monitoring under this report. Through the detailed assessment it is confirmed that The plant is owned by Starbigbloc Building Material Limited, a wholly owned subsidiary of

	Bigbloc Construction Ltd., one of India's leading AAC block manufacturers. The facility is state-of-the-art, using modern equipment and fully automated processes to ensure quality, efficiency, and compliance with green building norms. During the onsite visit it is confirmed that PD ensures the quality of the monitored data by maintaining the plant records and finished goods records in the Microsoft Dynamic 365 Business Central [4] The project's production capacity for AAC blocks, as per the registered PCN, is 250,000 cubic meters per annum. This was verified during the onsite visit through a review of the AAC block production data generated on Microsoft dynamics 365 Business Central /12/ for the current monitoring period and the ER sheet /9/. It was confirmed that the annual production remains within the specified limit of 250,000 cubic meters. These blocks are marketed under the "NXTBloc" brand which is verified via product catalogue /21/ and it serve a range of infrastructure sectors including residential, commercial, and industrial projects. The project not only contributes to climate action by reducing emissions but also supports the circular economy by using fly ash—a waste product from thermal power plants—as a primary raw material. The result is a reduction of 2,24,282 tCO_2e emission for current monitoring period as verified through the ER calculation sheet /9/, based on the displacement of energy-intensive red brick usage. The duration of the crediting period corresponding to the monitoring period is covered in this monitoring report. The start date of generation has been confirmed as the date of the first invoice/23/ issued by Star Bigbloc Building Material Limited, reflecting the start of project operations under their ownership. UCR Project ID or Date of Authorization: 527 or 30/04/2025 Start Date of Crediting Period: 20/02/2018 Project Commissioned: 16/06/2016 The project commissioning date has been verified via Consent to operate /18/ order no. AWH-79613 issued by Gujrat pollution control board on 16/06/2016. The Location details has been verified during the onsite visit and geo coordinates verified through google earth software /35/.

[4] https://www.microsoft.com/en-us/dynamics-365/products/business-central - Microsoft Dynamics 365 Business Central is a cloud-based business management solution designed to help small to medium-sized businesses manage and streamline their operations.

	  The above figure illustrates the location of the project activity, which has been verified using Google Earth software /35/. The project is confirmed to be situated at the geo-coordinates 22.95718, 73.10937. Accordingly, it is verified that the project activity is located in Savli village, Kheda district, Gujarat, India – consistent with the details provided in the registered PCN /10/ and Section A.2 of the Monitoring Report (Version 1.2). Hence it is confirmed that, the project description has been verified and applied AMS-III.Z, Fuel Switch, process improvement and energy efficiency in brick manufacture, Version 06.0/5/.
Findings	No findings have been raised in this regard
Conclusion	The description of the project activity is verified to be true based on the onsite visit observations and interviews /33/, review of PCN/10/, MR/8/, ER sheet/9/, Factory license/17/ and Consent to operate/18/.

D.3. Application and selection of methodologies and standardized baselines

D.3.1 Application of methodology and standardized baselines

Means of Project Verification	The project activity applied AMS-III.Z, Fuel Switch, process improvement and energy efficiency in brick manufacture, Version 06.0/5/. Baseline scenario is that the specific energy demand for manufacturing AAC blocks is lower compare to conventional bricks. AAC blocks are being manufactured by the autoclaving process, which is less energy intensive as compared to the thermal baking process used for manufacturing fired clay bricks. Thus, the project activity results in lower GHG emission as compared to the conventional clay bricks manufacturing process. The baseline scenario is the continued production of traditional fired clay bricks using coal- or fossil fuel-based kilns, which is a highly energy- and emission-intensive process. These bricks are typically manufactured in Fixed Chimney Bull's Trench Kilns (FCBTKs), clamp kilns, or other inefficient designs across India. As it is clearly mentioned in PCN/10/ and MR/8/.
Findings	CAR 3 have been raised in this regard and resolved successfully, for more details refer Appendix 4 of this report
Conclusion	The application of the selected methodology and standardized baseline has been thoroughly reviewed and found to be consistent with AMS-III.Z Fuel Switch, Process Improvement and Energy Efficiency in Brick Manufacture, Version 06.0 /5/. The project activity clearly demonstrates alignment with the key components and eligibility criteria outlined in the applied methodology, including the standardized baseline. It meets all relevant requirements stipulated under the UCR standards /3/. During the assessment, the Emission Reduction (ER) calculation sheet/9/ has been reviewed. It is confirmed that the project has applied the correct formulas and parameters as prescribed in the approved methodology/5/. This confirms that the project activity has correctly implemented the applicable methodology and standardized baseline, and the ER estimations are credible and methodologically sound.

D.3.2 Clarification on applicability of methodology, tool and/or standardized baseline

Means of Project Verification	Applicability as per AMS-III.Z, Version 06.0	Verifier assessment
	The methodology comprises one or more technology / measures listed below in brick1 production facilities: (a) Shift to an alternative brick production technology/process or installation of a new brick production technology/process; (b) Complete/partial substitution of fossil fuels or non-renewable biomass (NRB) with renewable biomass (including biomass from dedicated plantations or solid biomass residues such as sawdust and food industry organic liquid residues); (c) Complete/partial substitution of high carbon fossil fuels with low carbon fossil fuels;3 (d) Reduce the consumption of fossil fuels or NRB due to improvement of the production process.	During the onsite visit and interviews /33/ It is confirmed, that the project activity adopts option (a) installation of technology/process. a new brick production Hence, Project activity meets the applicability criterion. It aligns with the registered PCN /10/
	The measures may replace, modify, retrofit4 or add capacity to systems in existing facilities or be installed in a new facility.	The proposed project activity is a new facility (Greenfield project activity). Hence, Project activity meets the applicability criterion. It aligns with the registered PCN /10/
	The methodology is applicable for the production of: (a) Bricks that are the same in the project and baseline cases; or (b) Bricks that are different in the project case versus the baseline case due to a change(s) in raw materials, use of different additives, and/or production process changes resulting in reduced use or avoidance of fossil fuels for forming, sintering (firing) or drying or other applications in the facility as long as it can be demonstrated that the service level of the project brick is comparable to that of the baseline brick (see paragraph	While the blocks produced under the project activity differ from those in the baseline scenario in terms of raw materials, additives, and production process—including the avoidance of fossil fuels for forming, sintering, or drying—the end-use application, compressive strength, and functional performance of the blocks remain equivalent or superior compared to the baseline bricks. As per the comparative analysis sourced http://aerconindia.com/aac-vs-bricks.html the blocks produced in the baseline and project scenario demonstrate 6 as

	11). Examples include pressed mud blocks (soil blocks) with cement or lime stabilization5 and other 'unburned' bricks that attain strength due to fly ash, lime/cement and gypsum chemistry.	follows: **Parameter** / **Baseline** / **Project** Minimum Compressive strength (N/mm2) / 2.5-3 / 3.0 to 4.0 N/mm2(IS 2185, Part-3) Dry density (kg/m3) / 1950 / 550 – 650 This has been verified, Record for each control unit /24/ and raw material composition per mould during the onsite visit and interviews Therefore, point no. b of the criterion of the methodology is applied appropriately. It aligns with the registered PCN /10/
	New facilities (Greenfield projects) and project activities involving capacity additions are only eligible if they comply with the requirements for Greenfield projects and capacity increase projects specified in the "General guidelines for SSC CDM methodologies".	No capacity addition in the existing project. This is green field project activity which was verified and confirmed through onsite verification and interviewed with project owner and their representatives. In line with paragraph 37 of the "General Guidelines for SSC CDM Methodologies, v23.1"7 this project qualifies as a Type III Greenfield project, representing new facilities. The most plausible baseline scenario has been determined to be "burnt clay brick manufacturing using conventional technologies." Therefore, it is confirmed that, the project activity fulfils the necessary applicability criteria. It aligns with the registered PCN /10/
	The requirements concerning demonstration of the remaining lifetime of the replaced equipment shall be met as described in the "General guidelines for SSC CDM methodologies". If the remaining lifetime of the affected systems increases due to the project	The project activity is not a replacement or retrofit to an existing facility. In fact, it is being implemented as a Greenfield project. Hence, criteria is not applicable.

	activity, the crediting period shall be limited to the estimated remaining lifetime, i.e. the time when the affected systems would have been replaced in the absence of the project activity.	
	For existing facilities, it shall be demonstrated, with historical data, that for at least three years immediately prior to the start date of the project implementation, only fossil fuels or NRB (non-renewable biomass) were used in the brick production systems that are being modified or retrofitted. In cases where small quantities of renewable biomass were used for experimental purposes this can be excluded.	This is completely a greenfield project activity, so this criterion does not apply.
	The renewable biomass utilized by the project activity shall not be chemically processed (e.g. esterification to produce biodiesel, degumming and/or neutralization by chemical reagents) prior to the combustion but it may be processed mechanically (e.g. pressing, filtering) and/or thermally (e.g. gasification to produce syngas).	The project activity does not use renewable biomass as fuel, which has been verified by the onsite inspection and purchase records /11/.
	In cases where the project activity utilizes charcoal produced from renewable biomass as fuel, the methodology is applicable provided that: (a) Charcoal is produced in kilns equipped with a methane recovery and destruction facility; or (b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. A default value of 0.030 t CH4/t charcoal may be used in accordance with "AMS-III.BG.: Emission reduction through sustainable charcoal production and consumption"; (c) If charcoal is produced from other CDM project activities, it	The project does not involve use of charcoal produced from renewable biomass. Hence, criteria is not applicable. which has been verified through onsite assessment, purchase records /11/.

	shall be ensured that no double counting of the emission reductions occurs.	
	In the case of project activities involving changes in raw materials (including additives), it shall be demonstrated that additive materials are abundant in the country/region, according to the following procedures: Step 1: using relevant literature and/or interviews with experts, a list of raw materials to be utilized is prepared based on the historic and/or present consumption of such raw materials; (b) Step 2: the current supply situation for each type of raw material to be utilized is assessed and their surplus availability is demonstrated using one of the approaches below: (i) Approach 1: demonstrate that the raw materials to be utilized, in the region of the project activity, are not fully utilized. For this purpose, demonstrate that the quantity of material is at least 25 per cent greater than the demand for such materials or the availability of alternative materials for at least one year prior to the project implementation; (ii) Approach 2: demonstrate that suppliers of the raw materials to be utilized, in the region of the project activity, are not able to sell all of their supply of these materials. For	The project involves altering the raw materials used compared to the traditional method of manufacturing burnt clay bricks. It is a small-scale project with an annual capacity of 250,000 cubic meters of AAC (Autoclaved Aerated Concrete) blocks. This assessment focuses on using waste products as raw materials rather than commercially valuable industrial products. The primary raw material for the project is fly ash, a waste product, supplemented by small quantities of gypsum, lime, cement, and aluminium. Therefore, the assessment specifically considers the use of ash. The project activity uses around 65 wt.% of the fly ash. Being a byproduct of coal-based thermal power plants with annual generation of millions of tons, fly ash is abundantly available within a feasible distance from the plant. Its surplus availability has been demonstrated according to Approach 1 provided by the methodology. It has been verified through the page 55 of "report[5] on fly ash generation at coal / lignite based thermal power stations and its utilization in the country for the year 2021 – 22". around 117 million tons of fly ash generated and only 60.97% were utilized. Thus, it may be concluded that fly ash is available in abundance and the project activity meets the applicability criterion. Therefore, this demonstrates the abundant availability of fly ash and confirms that the project aligns with the relevant eligibility criteria and It aligns with the

[5] https://cea.nic.in/wp-content/uploads/tcd/2022/08/Fly_ash_Generation_and_utilisation_Report_2021_22-1.pdf

	this purpose, project participants shall demonstrate that a representative sample of suppliers of the raw materials to be utilized, in the region, had a surplus of materials (e.g. at the end of the period during which the raw material is sold) that they could not sell and that is not utilized.	registered PCN /10/
	This methodology is applicable under the following conditions: (a) The service level of project brick shall be comparable to or better than the baseline brick, i.e. the bricks produced in the brick production facility during the crediting period shall meet or exceed the performance level of the baseline bricks (in terms of, for example dry compressive strength, wet compressive strength, density). An appropriate national standard shall be used to identify the strength class of the bricks; bricks that have compressive strengths lower than the lowest class bricks in the standard are not eligible under this methodology. Project bricks are tested in nationally approved laboratories at six-month intervals (at a minimum) and test certificates on compressive strength are made available for verification; (b) The existing facilities involving modification and/or replacement shall not influence the production capacity beyond ±10 per cent of the baseline capacity unless it is demonstrated	The AAC blocks are having lower density & higher compressive strength compared to baseline traditional red clay brick which was verified through tests carried by BIS accredited Inhouse laboratory /16/ and product catalogue /21/. Also, PO has inhouse laboratory/16/ to test the compressive strength and density of AAC blocks of every batch produced to meet the criteria. It aligns with the registered PCN /10/

		that the baseline for the added capacity is the same as that for the existing capacity in accordance with paragraph 5 above; (c) Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO2 equivalent annually.	
		This methodology is not applicable if local regulations require the use of the proposed technologies or raw materials for the manufacturing of bricks unless widespread non-compliance (i.e. less than 50 per cent of brick production activities in the country comply) of the local regulation evidenced.	There are no such regulations which make it mandatory for the use of this technology in the region and Project proponent use this technology voluntarily, therefore this criterion does not apply to the project activity.
		In cases where the project activity utilizes biomass sourced from dedicated plantations, applicability conditions prescribed in the tool "Project emissions from cultivation of biomass" shall apply. If the project activity involves reducing the NRB consumption, project participants shall demonstrate that NRB has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports or statistics. The following cases are exempted from 'determining the occurrence of debundling' as per the "Guidelines on assessment of debundling for SSC project activities": (a) Project activities that aggregate brick units with holistic production cycles i.e. from raw material procurement to finished product, where each unit is not larger than 5 per cent of the Type III small-scale CDM project activity thresholds i.e. 3,000 t CO2e; or (b) Project activities that aggregate brick units, where each unit qualifies as Type	The project activity does not involve use of biomass. Hence, criteria is not applicable.

	III microscale CDM project activity and the geographic location of the project activity is a least developed countries/small island developing states (LDC)/(SIDS) or special underdeveloped zone (SUZ) of the host country as identified by the government in accordance with the guideline on "Demonstrating additionality of microscale project activities".	

Following tools are used to calculate leakage emissions

Tool 3 – Tool to calculate project or leakage C02 emission from fossil fuel combustion /6/

Tool 05 - to calculate baseline, project and/or leakage emissions from electricity consumption, Version 03.0

Tool 07 – Tool to calculate the emission factor for an electricity system, Version 7

Tool 12 – tool to calculate project leakage emissions from road transportation of freight version 01.0.0 /6/

The ER calculation sheet has been reviewed and it is found that it aligns with the Tool 3, Tool 5, Tool 7 and Tool 12.

Findings	CAR 3 has been raised in this regard and it is successfully resolved, for more details refer Appendix 4 of this report
Conclusion	As per the above assessment and the desk review of the UCR registered PCN, it is confirmed that, the methodology applied/4/ and the referred tools is appropriately meeting the requirements of UCR standard/2/ and its standardized baseline. The methodology version is correct and valid. The referenced methodology and tools are applicable to project activity.

D.3.3 Project boundary, sources and GHGs

Means of Project Verification	As per the applied methodology AMS-III. Z version 6.0/5/, the project boundary is the physical, geographical site where the brick production takes place during both the baseline and crediting periods. It also includes all installations, processes or equipment affected by the switching. The components of the project boundary mentioned in the section B.4 of PCN/10/ were checked against the para 19 of the applied methodology/5/. The project verification team conducted desk review of the implemented project to confirm the appropriateness of the project boundary identified and all GHG sources required by the methodology have been included within the project boundary. It was assessed that no emission sources related to project activity will cause any deviation from the applicability of the methodology or accuracy of the emission reductions. The project boundary is clearly depicted with the help of a

	pictorial depiction in section B.4 of the PCN/10/ and duly verified by the verification team via Factory license/17/, consent to operate and consent to establish /18//19/ and onsite inspection of the project activity/32/.
Findings	No findings have been raised in this regard
Conclusion	The project verification team was able to assess that complete information regarding the project boundary has been provided in PCN/10/ & MR/8/ and further can be assured from Factory license/17/ and Consent to operate/18/ The project verification team confirms that the identified boundary, selected emissions sources are justified for the project activity.

D.3.4 Baseline scenario

Means of Project Verification	As per the consolidated methodology AMS-III.Z. Version 06.0/5/, baseline scenario is that the specific energy demand for manufacturing AAC blocks is lower compare to conventional bricks. AAC blocks are being manufactured by the autoclaving process, which is less energy intensive as compared to the thermal baking process used for manufacturing fired clay bricks. Thus, the project activity results in lower GHG emission as compared to the conventional clay bricks manufacturing process. The baseline scenario defined in PCN/10/ and MR/8/ in the absence of the project activity; the bricks would have been produced through energy intensive technology.
Findings	No findings has been raised in this regard
Conclusion	The project verification team concluded that the identified baseline scenario reasonably represents what would occur in the absence of the project activity and it aligns with the applied methodology AMS-III.Z. Version 06.0 /5/

D.3.6 Estimation of emission reductions or net anthropogenic removal

Means of Project Verification	The project verification team checked whether the equations and parameters used to calculate GHG emission reductions or net anthropogenic GHG removals for PCN/10/ and MR/8/ is in accordance with applied methodology/5/. Section B.5 of the PCN/10/ & section C.5 of MR/8/ has been checked respectively to confirm whether all formulae to calculate baseline emissions, project emission and leakage emission have been applied in line with applied methodology/5/. As per the para 20 of the applied methodology/4/, baseline emission reduction calculation as followes: The baseline emissions are the fossil fuel and NRB consumption related emissions associated with the system(s), which were or would have otherwise been used, in the brick production facility(ies) in the absence of the project activity.The emissions are calculated as below: $BEy = SECBL * EF_{BL} * PP_{J,Y}$ Where: BEy = The annual baseline emissions from fossil fuels or NRB displaced by the project activity in t CO2 e in year y (of the crediting period) SECBL = Specific energy consumption of brick production in the baseline, TJ per unit volume or mass unit (kg or m3)

EFBL = The emission factor of baseline fuel(s), in t CO2 /TJ

PPJ,Y = The annual net production of the facility in year y, in kg or m3

a) Using manufacturers" specifications such as for brick production rate, energy consumption in the process;
b) Using specifications of comparable units having similar techno-economic parameters;
c) Using reference plant approach

In the project activity scenario annual production specific emission factor for installation of systems in a new facility is determined using option (b) as stated above. Indian Brick Industry falls under the unorganized small and medium enterprise category, wherein the economic considerations are comparable.

The baseline emission factor shall be calculated from emissions data of other brick manufacturing plants of capacity 2,50,000 m3/annum and using the common practice technology. As mentioned in section A6 of the PCN, the common practice technology in this sector is red clay fired clay bricks, across all plant capacities in India. For this project activity, the lower range of the emission factor of 195 gCO2/kg15 of brick has been directly sourced from the research paper[6]. So, only the density of AAC blocks produced in the project plant is different from that of baseline bricks. So, the emission factor of 195 gCO2/kg of brick has been converted into a volumetric emission factor as follows:

The annual production specific baseline emission factor during monitoring period as follows:

$EF_{BL} = (EF_{CO2,\ brick} / W_{brick}) * (D_{brick/1000})$

EFBL= The annual production specific emission factor for year y
EFCO2, brick = CO2 emission per baseline brick produced (as obtained from third party documents
Wbrick = Weight of each baseline brick produced
Dbrick = Density of each baseline brick produced

The annual production specific emission factor (EFBL) = 195 gCO2/kg*(1950kg/m3/1000)

Which is equals to 0.38025 tCO2/m3

The density of each baseline bricks has been verified via http://aerconindia.com/aac-vs-bricks.html which is found to be appropriate and acceptable.

The total Baseline Emissions during the Monitoring period are as below:

Year	Annual	EFBL	Baseline

[6] It has been verified via https://www.sciencedirect.com/science/article/abs/pii/S0959652616308381

	Production (m3/year)	(tCO2/m3)	Emissions (tCO2/year)
From 20/02/20218 to 31/12/2018	75,293	0.380	28,630
2019	1,69,202	0.380	64,338
2020	1,72,695	0.380	65,667
2021	2,11,901	0.380	80,575
2022	2,11,638	0.380	80,475
2023	2,04,116	0.380	77,615
2024	1,98,894	0.380	75,629

Project emissions

$PEy = PE_{elec,y} + PE_{fuel,y} + PE_{cultivation,y} + PE_{CH4,y}$

PEy = Project emissions in year y (t CO2)
$PE_{elec,y}$ = Project emissions due to electricity consumption in year y (t CO2)
$PE_{fuel,y}$ = Project emissions due to fossil fuel or NRB consumption in year y (t CO2)
$PE_{cultivation,y}$ = Project emissions from cultivation of biomass in a dedicated plantation in year y
$PE_{CH4,y}$ = Project emissions due to the production of charcoal in kilns not equipped with a methane recovery and destruction facility in year y (t CO2e)

Since the project does not involve any cultivation of biomass, production of charcoal in kilns, the $PE_{Cultivation,y}$, $P_{CH4,y}$ are considered zero.

Year	Electricity consumption (MWh/year)	Emission factor of electricity source (tCO2/MWh)	T&D losses (%)	Project emission due to electricity consumption (tCO2/yr)
From 20/02/20218 to 31/12/2018	648	0.921	20.66	702
2019	1,189	0.911	20.46	1,305
2020	1,123	0.903	20.73	1,224
2021	1,415	0.915	19.27	1,544
2022	1,487	0.919	17.68	1,608
2023	1,686	0.757	17.68	1,502
2024	1,550	0.757	17.68	1,381

Project Emission from fossil fuel consumption:

Year	Specific coal	Coal consump	NCV of	CO2 EF for coal	Project emission due

	consumption (kg/m3)	tion annually (kt/yr)	coal (TJ/kt)	(tCO2/TJ)	to electricity consumption (tCO2/yr)	
From 20/02/20218 to 31/12/2018	35.48	2.67	25.8	94.6	6,521	
2019	24.34	4.11	25.8	94.6	10,051	
2020	24.55	4.23	25.8	94.6	10,348	
2021	27.92	5.91	25.8	94.6	14,437	
2022	32.13	6.79	25.8	94.6	16,597	
2023	31.04	6.33	25.8	94.6	15,464	
2024	27.81	5.53	25.8	94.6	13,502	

Total Project emission during monitoring period PE:

Year	Project emission from electricity consumption (tCO2/yr)	Project emission from coal consumption (tCO2/yr)	Project emissions (tCO2/year)
From 20/02/20218 to 31/12/2018	720	6,521	7,242
2019	1,305	10,051	11,356
2020	1,224	10,348	11,573
2021	1,544	14,437	15,981
2022	1,608	16,597	18,205
2023	1,502	15,464	16,967
2024	1,381	13,502	14,883

Leakage Emissions

Freight Transportation Activities During the Monitoring Period

Sr. No	Freight Type	Weight (Tonne)	Origin	Destination	Road Distance (Km)	Vehicle Class
1	Cement	19,404.19	Chittorgarh	Kapadvanj	331 (Single Trip)	Heavy
2	Fly Ash	57,500.14	Balasinor	Kapadvanj	53.8 (Round Trip)	Heavy
3	Lime	8,316.145	Jodhpur	Kapadvanj	461 (Single Trip)	Heavy
4	Gypsum	2,056	Rajkot	Kapadvanj	274 (Single Trip)	Heavy
5	Aluminium	77.22	Nagpur	Kapadvanj	783 (Single Trip)	Heavy
6	Coal	4,074.84	Magdalla	Kapadvanj	255 (Single Trip)	Heavy

Total Leakage Emission During Monitoring Period (LE)

Year	Leakage Emission Due to Raw Material Production (tCO_2/yr)	Leakage Emission Due to Raw Material Transportation (tCO_2/yr)	Total Leakage Emissions (tCO_2/yr)
2018 (20th Feb – 31st Dec)	7,790	915	8,705
2019	17,398	1,937	19,336
2020	19,097	2,061	21,158
2021	24,107	2,537	26,645
2022	25,156	2,660	27,817
2023	22,732	2,488	25,220
2024	21,140	2,419	23,559

Emissions Reductions and Removals

Year	Baseline Emissions (tCO_2e)	Project Emissions (tCO_2e)	Leakage Emissions (tCO_2e)	Emission Reduction (tCO_2e)
2018 (20th Feb – 31st Dec)	28,630	7,242	8,705	12,683
2019	64,338	11,356	19,336	33,646
2020	65,667	11,573	21,158	32,936
2021	80,575	15,981	26,645	37,949
2022	80,475	18,205	27,817	34,453
2023	77,615	16,967	25,220	35,428
2024	75,629	14,883	23,559	37,187
Total	**4,72,929**	**96,207**	**1,52,440**	**2,24,282**

The calculated values of total baseline emission reductions, project emissions and leakage emissions for the monitoring period has been verified as below:

Baseline Emission	4,72,929 tCO2eq

	<table><tr><td>Leakage Emission</td><td>1,52,440 tCO2eq</td></tr><tr><td>Project Emission</td><td>96,207 tCO2eq</td></tr><tr><td>Total ERs generated (tCO2e)</td><td>2,24,282 tCO2eq</td></tr></table> Calculation: ER = 4,72,929 − 96,207 − 1,52,440 = 2,24,282 tCO_2e This verification was carried out through a review of the ER sheet /9/ and plant records maintained at site. The data is found to be accurate and well-maintained using the Microsoft Dynamics 365 Business Central software/12/, which is recognized as an authentic and reliable enterprise resource planning tool. It is also confirmed that calculations are as per the applied methodology and tools which is compliance with the UCR standards requirements.
Findings	CAR 3 have been raised in this regard and it has been resolved successfully. For more details refer Appendix 4
Conclusion	Project Verification team confirm that the algorithms and formulae proposed to calculate project emissions, baseline emissions, leakage and emission reductions in the PCN/10/ and MR/8/ and ER sheet /9/ is in line with the requirements of the selected methodology AMS-III.Z, version 06.0/5/ For the calculation, the assessment team confirms that All assumptions and data used by the project participants are listed in the PCN/10/ including their references and sources. All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PCN/10/ & MR/8/. All values used in the PCN/7/ & MR/9/ are considered reasonable in the context of the proposed project activity The baseline methodology and the applicable tool(s) have been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions; All calculations are complete and without any omissions.

D.3.7 Monitoring Report

<table>
<tr><td>Means of Project Verification</td><td>
The monitoring report/8/ submitted by the PP/PO has been verified thoroughly against the requirements of applied methodology/5/, registered PCN and UCR standard/3/ for calculation of GHG emission reductions. The assessment team has reviewed all the parameters in the monitoring plan against the requirements of the applied methodology and monitoring parameters are applied in line with the requirement of the methodology and relevant in the context of the UCR program. The procedures have been reviewed by the assessment team through document review and interviews with the respective monitoring personnel. Relevant points have been discussed with the project owner specifically; monitoring methodology, data management and calibration of the equipment.

Monitoring plan
Monitoring plant as stipulated in section C.10 of Monitoring report final version 1.2 /8/ has been verified during the onsite visit and desk review of the supporting documents. The assessment of each Data/Parmeter included in monitoring plan is as follows:
<table>
<tr><th>Data and parameter</th><th>Description</th><th>MOV and assessment</th></tr>
<tr><td>EF_{BL}</td><td>The annual production specific baseline emission factor</td><td>The value of the parameter has been verified as 0.38 tCO2/m3 which is calculated based on data from “CO2 emission factor for clay brick” taken from Science direct “journal of cleaner Production[7]”
And “Density of bricks” has been verified via http://aerconindia.com/aac-vs-bricks.html and calculation has found correct in ER sheet /9/</td></tr>
<tr><td>EF_{cement}</td><td>CO2 emission factor of cement production</td><td>The applied value for the parameter has been verified as 0.576 tCO2/t through the review of ER sheet /9/ and “alliance for an energy efficient economy-emission Reduction Approaches for the cement industry[8] ” the source of data is found to be accurate. Alliance for an Energy Efficient Economy (AEEE) published the data using The International Energy Agency (IEA), Cement Sustainability Initiative (CSI), and World Business Council for Sustainable Development (WBCSD) as a reference. So, the source is</td></tr>
</table>
</td></tr>
</table>

[7] https://www.sciencedirect.com/science/article/abs/pii/ S09596 52616308381
[8] https://aeee.in/emission-reduction-approaches-for-the-cement-industry/

		reliable.	
$EF_{aluminium}$	CO2 emission factor of aluminium production	The value for the parameter has been verified and confirmed as 1.7 tCO2/t through ER sheet and IPCC report on NGGI and The IPCC Report is a reliable source of information.	
EF_{lime}	CO2 emission factor of lime production	The value for the parameter has been verified and confirmed as 0.75 tCO2/t through the review of ER sheet and IPCC Guidelines[9] . IPCC report /31/ is a reliable source of information which is acknowledged worldwide.	
EF_{gypsum}	CO2 emission factor of gypsum production	The value of parameter has been verified as o.o1 tCO2/t through the review of ER sheet and crosschecking it with EU ETS post 2012 sector report for gypsum industry [10]	
$EF_{CO2,f}$	Default CO2 emission factor for freight transportation activity f	The value for the parameter has been verified as as Heavy vehicle – 129 which is based on the applied methodological tool "Tool 12- to calculate Project and leakage emissions from road transportation of freight."(Version 01.0.0). It is also crosschecked during the Interviews with the relevant personals.	
D_{brick}	Density of each baseline brick produced	The value of the parameter has been verified as 1950 kg/m3 via review of the ER sheet /10/ and the default data provided by "Aerocon India"/30/ which is an authentic source	
$EF_{CO2,\ brick}$	CO2 emission factor for clay brick	The value of the parameter has been verified as 195 gCO2/kg of brick through the report by journal of cleaner production on "carbon footprint of solid clay bricks fired in clamps of India[11]"	
$EF_{EL,plant,y}$	Emission factor for electricity used in project plant in year y	It is confirmed that the value of the parameter has been verified through the CEA database "CO2 Baseline Database for Indian Power Sector User Guide[12]" which is an authentic source and it is found to be accurate.	

[9] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/3_Volume3/V3_2_Ch2_Mineral_Industry.pdf
[10] https://climate.ec.europa.eu/system/files/2016-11/bm_study-gypsum_en.pdf
[11] Carbon footprint of solid clay bricks fired in clamps of India - ScienceDirect
[12] https://cea.nic.in/wp-content/uploads/baseline/2024/01/User_Guide__Version_19.0.pdf

	PPJ,y	The annual production of the facility in year y.	The parameter has been verified through the review of the Plant Records during the onsite visit and the review of ER calculation sheet /9/, it is confirmed that the applied value for annual production of facility in year y are accurate.	
	$NCV_{coal,y}$	Average Net Calorific Value of coal in the year y.	It is confirmed that the value of the parameter - average net calorific value of coal in year y has been verified as 25.8 through the review of IPCC Guidelines on NGGI (Vol. 2, Ch. 1, Pg. No. 1.18, Table 1.2)[13]	
	Q_{cement}	Quantity of cement used in AAC Block production during the monitoring period.	It is confirmed that, the value of the parameter has been verified through the review of ER calculation sheet , and records of data in logbook and values are found accurate for current monitoring period.	
	Q_{flyash}	Quantity of fly ash used in AAC Block production during the monitoring period.	It is confirmed that, the value of the parameter has been verified through the review of ER sheet and crosschecking it with the records of data in logbooks	
	Q_{lime}	Quantity of lime used in AAC Block production during the monitoring period.	It is confirmed that, the value of the parameter has been verified through the review of ER sheet and crosschecking it with the Plant records during the onsite visit and it is found accurate. The data is continues monitoring and monthly recorded	
	Q_{gypsum}	Quantity of gypsum used in AAC Block production during the monitoring period.	It is confirmed that, the value of the parameter has been verified through the review of the ER sheet and plant records (receipts) which is continuously monitored	
	$Q_{aluminium}$	Quantity of aluminium used in AAC Block production during the monitoring period.	It is confirmed that, the value of the parameter has been verified through the review of the ER sheet and plant records (receipts) which is continuously monitored	
	Q_{Coal}	Quantity of aluminium used in AAC Block production	The parameter value has been verified through a review of the ER sheet and supporting plant records (receipts), which are subject to	

[13] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

	during the monitoring period.	continuous monitoring. Although the parameter is not included in the registered PCN /10/, it has been introduced in the current monitoring period to ensure transparent and accurate representation of leakage emission calculations.	
FR_{Cement}[14]	Quantity of Cement Purchase during monitoring period	It is confirmed that, the value of the parameter has been verified through the review of the ER sheet and plant records (receipts)/11/ which is continuously monitored. Although the parameter is not included in the registered PCN /10/, it has been introduced in the current monitoring period to ensure transparent and accurate representation of leakage emission calculations.	
FR_{Flyash}	Quantity of Fly ash Purchase during monitoring period	It is confirmed that, the value of the parameter has been verified through the review of the ER sheet and plant records (receipts) which is continuously monitored. Although the parameter is not included in the registered PCN, it has been introduced in the current monitoring period to ensure transparent and accurate representation of leakage emission calculations.	
FR_{lime}	Quantity of Lime Purchase during monitoring period	It is confirmed that, the value of the parameter has been verified through the review of the ER sheet and plant records (receipts) which is continuously monitored. Although the parameter is not included in the registered PCN /10/, it has been introduced in the current monitoring period to ensure transparent and accurate representation of leakage emission calculations.	
FR_{Gypsum}	Quantity of Gypsum Purchase during monitoring period	It is confirmed that, the value of the parameter has been verified through the review of the ER sheet and plant records (receipts) which is continuously monitored. Although the parameter is not included in the registered	

[14] All values for Parameters FR Cement /FR Flyash/FR Lime/FR Gypsum /FR Aluminium/FR Coal are compiled through weighing all raw materials upon arrival through a 60T Non automatic weighing Instrument Electronic and recorded in register and subsequently in Office 365 Business Solution. Weigh bridge is verified annually by "Controller Legal metrology Gujarat state and it's last verification has been carried out on 17/12/2024 /37/.

			PCN/10/, it has been introduced in the current monitoring period to ensure transparent and accurate representation of leakage emission calculations.	
	$FR_{Aluminium}$	Quantity of Aluminium Purchase during monitoring period	It is confirmed that, the value of the parameter has been verified through the review of the ER sheet and plant records (receipts) which is continuously monitored. Although the parameter is not included in the registered PCN /10/, it has been introduced in the current monitoring period to ensure transparent and accurate representation of leakage emission calculations.	
	FR_{Coal}	Quantity of Coal Purchase during monitoring period	It is confirmed that, the value of the parameter has been verified through the review of the ER sheet and plant records (receipts) /11/ which is continuously monitored. Although the parameter is not included in the registered PCN, it has been introduced in the current monitoring period to ensure transparent and accurate representation of leakage emission calculations.	
	$EC_{PJ,y}$	Quantity of electricity consumed by the project plant in year y.	It is confirmed that, the value of the parameter has been verified through the review of the ER sheet /9/ and electricity bills for current monitoring period has been checked and it is found accurate.	
	$Df_{,m,\ flyash}$	Return trip road distance between the origin and destination of fly ash transportation activity f in monitoring period m	It is confirmed that, the value of the parameter has been verified as 53.8 Km through the review of ER sheet and crosschecking the value with Google Map software /35/. It is return trip road distance between the origin and destination of fly ash transport activity f in the monitoring period m	
	$Df_{,m,\ gypsm\ \&\ POP}$	Road distance between the origin and destination of gypsum and POPtransportation activity f in	It is confirmed that, the value of the parameter has been verified as 274 Km through the review of ER sheet and crosschecking the value with Google Map software /35/.	

	monitoring period m		
$Df_{,cement}$	Road distance between the origin and destination of cement transportation activity f in monitoring period m	It is confirmed that, the value of the parameter has been verified as 331 Km through the review of ER sheet and crosschecking the value with Google Map software /35/.	
$Df_{,m,lime}$	Road distance between the origin and destination of lime transportation activity f in monitoring period m	It is confirmed that, the value of the parameter has been verified as 461 Km through the review of ER sheet and crosschecking the value with Google Map software /35/.	
$Df_{,m}$ Aluminium	Road distance between the origin and destination of aluminium transportation activity f in monitoring period m	It is confirmed that, the value of the parameter has been verified as 783 Km through the review of ER sheet and crosschecking the value with Google Map software /35/.	

The data/parameter has been monitored appropriately in accordance with the registered monitoring plan/03/ and applied methodology/B07/. The monitored data was recorded consistently as per the approved frequency in monitoring plan/03/. Since all required data has been monitored and verified, the verification team can ascertain that the values used for calculation of emission reduction are free from material errors. Implementation of the project is as per the registered monitoring plan.

Findings	CAR 3 have been raised and successfully closed , for more details refer Appendix 4 of this report
Conclusion	The project verification team confirms that, The monitoring report/8/ is in compliance with the applicable methodology/5/ and UCR standard/3/. The monitoring parameter reported in MR/28/ adequately represents the parameters relevant to emission reduction calculation. The calibration report ensures the accuracy of the data reported. The number of CoUs generation is calculated based on the accurately reported data. The calculation was done using an excel sheet where all the parameters were reported. The emission factor for electricity consumption is as per UCR standard. In the monitoring report/9/, emission reduction calculations are correctly calculated and reported and meets the requirements of UCR project verification standard/3/

D.4 Start date, crediting period and duration

Means of Project Verification	The project was commissioned on 16/06/2016, as confirmed through the review of the Consent to Operate (CTO) document /18/, which is in compliance with the applicable UCR standards. However, the start date of the project activity is considered to be 20/02/2018, corresponding to the date of the first invoice issued by Star Bigbloc Building Material Limited, thereby indicating the commencement of project operations under the current ownership. This start date has been further substantiated through the review of the valid factory license /17/. Crediting period corresponding to this monitoring period for the project activity is from 20/02/2018 to 31/12/2024 which aligns with the requirements of UCR standards/3//4/.
Findings	No findings have been raised in this regard
Conclusion	Based on the review of supporting documents including the CTO, factory license, and invoice records, it is concluded that the project activity complies with UCR requirements regarding start date and the duration of the crediting period The defined crediting period from 20/02/2018 to 31/12/2024 is valid and appropriately justified which aligns with the UCR registered PCN.

D.5 Positive Environmental impacts

Means of Project Verification	The AAC block project by Starbigbloc Building Material Limited provides substantial environmental benefits that support sustainable development and ensures no harm is caused to local communities or ecosystems. • Emission Reduction: The project avoids GHG emissions from coal-fired brick kilns by using an autoclaving process powered by lower-energy inputs. • Resource Conservation: Utilizes fly ash—a hazardous industrial waste—as a primary input, reducing environmental burden and conserving natural topsoil. • Pollution Control: No air emissions or sintering processes are involved, leading to lower particulate pollution and minimal solid waste generation. As per the review of Consent to operate/18/and Consent to establish (CTE) /19/ obtained from Gujarat Pollution Control Board and complying all the rules and regulations mentioned thereof. It is confirmed, that impact of the project activity on the environmental safeguards has been carried out. Out of all the safeguards no risks were identified to the environment due to the project implementation and operation. The facility utilizes the waste products like Fly ash which create environmental pollution by increasing dust levels of atmosphere. And the following have been indicated as positive impacts by using fly ash as the main ingredient for block production it helps reduce the environmental hazard caused due to improper disposal of fly ash and other thermal plant waste products. The project activity will cause comparatively less air pollution, water pollution and disposal of solid waste to the environment which otherwise would have been generated if the traditional technology was used for brick manufacturing. The consumption of energy (electricity/fuel) to generate steam is much lower compared to the thermal energy consumed for the production of burnt clay bricks and hence displaces the carbon intensive coal/fuel oils.
Findings	No findings have been raised in this regard
Conclusion	Through the onsite observation and detailed desk review, it is confirmed that, the project activity displaces conventional raw material – Clay with waste product Fly ash for production of AAC Blocks that is less energy intensive process. The project has also avoided total 2,24,282 tCO2. Based on the review of the ER sheet and the supporting documentations it is confirmed that Project Activity is not likely to cause any negative harm to the environment but would have a positive impact.

D.6. Local stakeholder consultation

The local stakeholder consultation process has been assessed in accordance with the applicable Project Verification requirements outlined in the Verification Standard and Project Standard. During the onsite verification, the assessment team conducted interviews /33/ with relevant stakeholders including plant personnel and local representatives.
It is confirmed that stakeholders are aware of the grievance and feedback mechanism in place, specifically the suggestion box located at the plant site /14/ . The existence and accessibility of the suggestion box were physically verified by the assessment team during the site visit. Stakeholders expressed that they are informed about the purpose of the box and its role in enabling them to voice concerns or provide suggestions.
During the interviews, stakeholders provided positive feedback regarding the project's impact, notably highlighting benefits such as local employment generation and timely salary disbursement.
Based on the onsite observations and stakeholder interactions, it is concluded that an appropriate and transparent stakeholder consultation process is in place and functioning effectively, with no outstanding issues or non-conformities identified

D.7. Approval and Authorization- Host Country Clearance

The approval and host country clearance have been assessed in line with applicable Project Verification requirements. The assessment team has reviewed the necessary statutory documents, including:

- Consent to Establish and Consent to Operate issued by the Gujarat Pollution Control Board /18/,
- Factory License granted by the Directorate of Industrial Safety and Health, Government of Gujarat /17/, and
- Valid Boiler Certificate /20/.

The documentation reviewed confirms that the project activity holds all requisite approvals and operational authorizations from relevant regulatory authorities in the host country. Hence, the host country clearance is deemed satisfactory and in compliance with verification requirements

D.8. Project Owner- Identification and communication

Means of Project Verification	Ownership of the project activity has been thoroughly verified through the review of the Factory License /17/ and relevant No Objection Certificates (NOCs) and approvals issued by the competent government authorities /17//18//19//. This assessment was further substantiated through interviews with key personnel during the onsite visit /33/. The Autoclaved Aerated Concrete (AAC) block manufacturing facility was initially commissioned and implemented by Hilltop Concrete Private Limited in 2016. The plant was established for the production of AAC blocks using raw materials such as cement, fly ash, sand, lime, aluminum powder, and water. In 2018, the facility was acquired by Bigbloc Construction Ltd., and the ownership was legally transferred. Subsequent to the acquisition, the plant was brought under the operational and legal control of Star Bigbloc Building Material Limited—a wholly owned subsidiary of Bigbloc Construction Ltd. Significant upgrades and modifications were undertaken following the takeover, including improvements in plant operations, machinery, and internal systems, while retaining the original AAC block manufacturing process and technology. Considering the change in ownership and associated operational

	restructuring, the project start date under the current ownership has been taken as 20th February 2018, corresponding to the date of the first invoice issued by Star Bigbloc Building Material Limited. This date has been adopted as the baseline for crediting and monitoring purposes under the current reporting period. The plant is confirmed to be wholly owned and operated by Star Bigbloc Building Material Limited, a subsidiary of Bigbloc Construction Ltd., which is recognized as one of India's leading AAC block manufacturers. The facility is equipped with modern, automated systems and operates in compliance with quality and environmental standards. During the onsite assessment, it was confirmed that the Project Developer ensures robust data quality management. Plant operations and finished goods records are systematically maintained using Microsoft Dynamics 365 Business Central /12/, ensuring traceability, reliability, and transparency of monitored data. Accordingly, the ownership structure and operational responsibility of the project activity are deemed clearly defined, well documented, and fully compliant with verification requirements
Findings	No findings have been raised in this regard
Conclusion	The ownership details of the project activity have been verified through the review of the UCR-registered Project Concept Note /10/, Consent to Establish (CTE)/19/, Consent to Operate (CTO)/18/, and the factory license /17/. Based on the assessment of these documents, the verification team confirms that the ownership of the project activity resides with Star Bigbloc Building Material Limited and it is aligned with the UCR verification standards and criteria.

D.9. Environmental Safeguards

The Assessment team has assessed the project activity in accordance with the Verification and Project Standards to confirm that it does not cause any net harm to the environment.

The AAC block project implemented by Star Bigbloc Building Material Limited demonstrates clear environmental benefits through reduced GHG emissions, resource efficiency, and pollution control. The project utilizes fly ash—a hazardous industrial by-product—as a key input, thereby reducing environmental burden and conserving natural resources such as topsoil. Unlike traditional brick manufacturing, the AAC production process is energy-efficient, does not involve sintering, and generates minimal air and solid waste pollution.

Verification of the project's environmental compliance has been conducted through review of the Consent to Establish and Consent to Operate issued by the Gujarat Pollution Control Board /18//19/. It is confirmed that the project adheres to applicable environmental regulations and no adverse environmental risks were identified.

Site observations and interviews further confirmed that the project displaces conventional raw materials (e.g., clay) with industrial waste (fly ash), contributing to better waste management and air quality. The activity has resulted in the avoidance of 2,24,282 tCO_2 emissions, reinforcing its net-positive environmental impact.

No findings or non-compliances have been raised in this regard. Therefore, it is concluded that the project activity will not cause net harm to the environment and contributes positively to sustainable development.

D.10.Positive Social Impact

Means of Project Verification	As per Section A.2 of the registered Project Concept Note (PCN) and Section B.2 of the Monitoring Report /8/, the positive social impacts of the project activity have been assessed and verified through documentation review, stakeholder interviews, and onsite observations. 1. **Employment Generation**: The project has contributed to both direct and indirecemployment opportunities for skilled and unskilled labour within the Kheda district, with a particular focus on the rural community of Savli village. During the onsite visit and interviews with local stakeholders, it was confirmed that individuals have been employed on a permanent basis as a result of the project activity. Notably, the project has also facilitated employment for women in the region. Employment records /26/ were reviewed and found to corroborate the claims of employment generation. 2. **Skill Development:** The project provides training to local workers in the operation of advanced, automated AAC block manufacturing systems. This initiative enhances the long-term employability of the local workforce. Interviews conducted during the site visit /33/ confirmed that local labourers have received relevant technical training as part of their employment. 3. **Health and Safety:** In contrast to conventional brick kilns, which involve combustion and the emission of harmful particulates, the AAC manufacturing process is cleaner and does not pose combustion-related health hazards. This contributes to improved air quality and better health outcomes for workers and the surrounding community. Health and safety records /22/ were reviewed, and site observations confirmed that safety protocols are being followed in accordance with national regulations. It is therefore concluded that the project owner ensures compliance with the host country's health and safety standards. Additionally, Ongoing communication with stakeholder has been verified during the onsite visit through the interviews with stakeholders and observation of the suggestion box at site to facilitate stakeholder engagement.
Findings	No findings have been raised in this regard
Conclusion	Based on the review of project documentation, employment records, health and safety logs, and stakeholder interviews conducted during the onsite visit, it is concluded that the project activity has generated measurable positive social impacts. These include employment

	creation—particularly for local and female workers—skills enhancement through technical training, and improved health and safety conditions at the workplace. The project is in alignment with the stated social benefits and complies with relevant national and UCR standards.

Sustainable development aspects (if any)

Means of Project Verification

As per section A.2 of the registered PNC and section B.2 of the Monitoring report /8/ Implementation of the SDG 9, SDG 11, SDG 12 and SDG 13 has been assessed

SDG Goal	Project Contribution	MOV
SDG 9 – Industry Innovation and infrastructure	The project promotes energy-efficient infrastructure modern, and introduces innovative green manufacturing practices in the construction sector.	Verified through review of technology specifications /21/, site visit observations /32/, and interviews/33/ confirming the use of advanced AAC production systems.
SDG 11 – Sustainable cities and communities	By producing eco-friendly building materials, the project supports green construction and development.	Confirmed through review of product specifications/21/, onsite visit observations /32/and stakeholder interviews during onsite visit/33/.
SDG 12 – Responsible and production	Uses fly ash, an industrial waste, as a raw material, promoting circular economy and reducing landfill burden.	Verified via raw material input records /11/, procurement logs, and site observation /32/ confirming the use of fly ash in AAC block production.
SDG 13 – Climate Action	Replaces high-emission clay brick production with a low-carbon process, resulting in substantial GHG emission reductions.	Verified through review of the applied methodology, emission reduction (ER) calculations, and cross-checked with monitoring data and ER sheet /9/.

Based on the onsite observations, stakeholder interviews, and comprehensive review of supporting documents—including the manufacturing process documentation, product catalogue, project equipment observed during the visit, raw material usage records, and the Emission Reduction (ER) sheet in line with the applied methodology—it is confirmed that the project activity has effectively implemented the Sustainable Development Goals (SDGs) as stated above. The evidence demonstrates alignment with the intended social, environmental, and technological contributions outlined in the MR.

Findings	No findings have been raised in this regard
Conclusion	Based on the assessment outlined in Section A.2 of the registered PCN and Section B.2 of the Monitoring Report, and supported by onsite observations, stakeholder interviews, and verification of relevant documentation, it is concluded that the project activity has effectively implemented SDG 9, SDG 11, SDG 12, and

	SDG 13. The project demonstrates measurable contributions to sustainable industrial practices, green infrastructure, responsible resource use, and climate change mitigation, in full alignment with the stated objectives and requirements of the UCR standards.

Others (No Double counting)

Means of Project Verification	An independent assessment is conducted to verify that the project activity has not been registered under any other greenhouse gas (GHG) programs or schemes. A thorough search across relevant GHG registries was performed to confirm that the emission reductions claimed under this project has not been, and are not being, credited elsewhere. Additionally, the project's commitment to avoiding double counting of emission reductions has been verified through the review of the agreement /13/ in accordance with Clause 1.8 of the Universal Carbon Registry (UCR) Program Manual (Version 6.1, August 2022). The following registries are reviewed as part of this assessment: • http://cdm.unfccc.int/ • Verra Search Page • https://cri.nccf.in/ • International Carbon Registry - International Carbon Registry • GCC PROJECTS PORTAL (globalcarboncouncil.com) • https://biocarbonregistry.com/en/projects/ • https://wilder.earth/social_carbon • https://www.ecoregistry.io/ • https://www.carbonregistry.com/explore/projects • https://wilder.earth/social_carbon • https://www.recregistryindia.nic.in/ • https://www.ecoregistry.io/ • https://www.ecohz.com/wiki/what-is-an-energy-attribute-certificate-eac Further, verification team also confirms that this project doesn't falls under any NDC regulations as per the independent assessment of website climate action tracker-India.
Findings	
Conclusion	In conclusion, the project's exclusive registration under UCR for the current monitoring period, along with its absence from rejection lists of other GHG programs, has been comprehensively verified, ensuring the integrity and credibility

	of its GHG benefits claims. Double accounting agreement/13/ found to appropriate as per clause 1.8, Universal Carbon Registry Program Manual (Ver 6.1) August 2022/1/.

Section E. Internal quality control

The final verification report passed a technical review and completeness check/ Quality check before being submitted to the client for forward submission to UCR. A technical reviewer qualified in accordance with VKU certification competency form which VKU.F8A. Competency Evaluation of Personnel (Internal Document) for validation and verification of GHG projects performed the technical review. The comments raised during the technical review stage is thoroughly addressed by the assessment team. After the comments raised during this stage is successfully addressed, the Final verification report undergo VKU's Completeness/Quality Check before issuance.

Section F. Project Verification opinion

VKU Certification Pvt. Ltd., contracted by Starbigbloc Building Material Limited (Project Owner) , has performed the independent verification of the emission reductions for the UCR Project ID 527 "AAC block project by Starbigbloc Building Material Limited" for the monitoring period 20/02/2018 to 31/12/2024 (corresponding to the crediting period) as reported in the Monitoring Report, Version 1.2 dated 16/05/2025. Starbigbloc Building Material Limited is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity. VKU commenced the verification against the Applied Baseline Methodology: AMS-III.Z.: "Fuel Switch, process improvement and energy efficiency in brick manufacture", Version 06.0 the monitoring plan contained in the registered PCN Version 1.0 dated 23/04/2025, and Monitoring Report Version 1.2 dated 16/05/2025. VKU Certification confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements. This verification report has been prepared using the latest available template specified by UCR registry and complies with the instructions to follow as per UCR Verification standards version 2.0 dated Aug 2022 and UCR CoU standards Aug 2024 version 7 /4/. The verification activities were conducted in accordance with VKU Certification's Quality Manual System and SOP 4/36/ and as per the UCR verification standard v 2.0 /3/. As a result, it is concluded that the emission reductions from the UCR Project ID 527 "AAC block project by Starbigbloc Building Material Limited" are correctly reported in the Monitoring Report Version 1.2 dated 16/05/2025 /8// and corresponding ER sheet /9/ for the monitoring period 20/02/2018 to 31/12/2024 (both dates included) amounted to 2,24,282 tCO2e(2,24,282 CoUs). VVB opinion on issuance as per the ISO 14064-3, clause 9 which is compliance with UCR Verification standards version 2.0 dated Aug 2022 and UCR CoU standards Aug 2024 version 7.

The verification Opinion is stated below-

Opinion	Final Documents	Monitoring period	Emission Reduction achieved	Remark
Positive opinion	Monitoring report version 1.2 ER Sheet version 1.2	20/02/2018 to 31/12/2024	2,24,282 tCo2eq	The GHG reductions emission are calculated on the basis of approved methodology AMS-III.Z.: "Fuel Switch, process

				improvement and energy efficiency in brick manufacture", Version 06.0 /5/ and the monitoring plan included in the registered PCN /10/

Appendix 1. Abbreviations

Abbreviations	Full texts
UCR	Universal Carbon Registry
GPCB	Gujarat Pollution Control Board
AAC	Autoclaved Aerated Concrete
CEA	Central Electricity Authority
MR	Monitoring Report
PCN	Project Concept Note
VR	Verification Report
VS	Verification Statement
DAA	Double Accounting Agreement
PP/PO	Project Proponent / Project Owner
PA	Project Aggregator
ER	Emission Reduction
CoUs	Carbon Offset Units
tCO_2e	Tons of Carbon Dioxide Equivalent
kWh	Kilo-Watt Hour
MWh	Mega-Watt Hour
CDM	Clean Development Mechanism
SDG	Sustainable Development Goal
CAR	Corrective Action Request
CL	Clarification Request
FAR	Forward Action Request
GHG	Greenhouse Gas

Appendix 2. Competence of team members and technical reviewers

Team Leader cum technical expert (TA 4.1)

Certification Pvt. Ltd. VKU.F50W. Competence Statement

COMPETENCE STATEMENT

Name	Sunil Kathuria
Nationality	Indian
Countries of Experience	Malaysia, Uganda, Kenya, South Africa, Nigeria, Bangladesh, China, Vietnam, Thailand, Philippines, United Kingdom, Germany, USA
Educational Qualification	B.E. (Electrical Power)
Year of Experience	40 Years
Area of Expertise	Climate Change & Environment
Eligible Sectoral Scope	SS 1 – TA 1.1 – Thermal energy generation SS 1 – TA 1.2 – Renewables SS 2 – TA 2.1 - Energy distribution SS 3 – TA 3.1 - Energy Demand SS 4 – TA 4.1 – Cement and lime production (Manufacturing Industries) SS 13 – TA 13.1 Solid Waste & Wastewater He is a **GS Approved Auditor**
Approved for Registries	☒ VCS ☒ SD Vista ☐ Plastic Credit ☒ GS4GG ☒ UCR ☒ UWR ☒ ICR ☒ CERCARBONO ☒ CR-i

Roles approved in VKU

Project Trainee	NO
Validator/Verifier Trainee	NO
Validator	YES
Verifier	YES
Team Leader	YES
Technical Reviewer	YES
Local Expert (India)	YES
TA Expert (1.1, 1.2, 2.1, 3.1, 4.1, 13.1)	YES
Financial Expert	NO

Reviewed by	Apoorva Gupta (Quality Manager)	Date	09/04/2025
Approved by	Barun Kumar (Technical Manager)	Date	09/04/2025

Validator Verifier Trainee

COMPETENCE STATEMENT

Name	Sanjana Bhana
Nationality	Indian
Countries of Experience	India
Educational Qualification	M.Sc. (Environmental Sciences) B.Sc. (Life Sciences, Biotechnology, Chemistry)
Year of Experience	2.5 Years
Area of Expertise	Climate Change &Environment / Industry
Eligible Sectoral Scope	NA
Approved for Registries	☒ VCS ☒ SD Vista ☒ Plastic Credit ☒ GS4GG ☒ UCR ☒ UWR ☒ ICR ☒ CERCARBONO ☒ CR-i

Roles approved in VKU

Project Trainee	NO
Validator/Verifier Trainee	YES
Validator	NO
Verifier	NO
Team Leader	NO
Technical Reviewer	NO
Local Expert *(Country Wise)*	NO
TA Expert *(X.X)*	NO
Financial Expert	NO

Reviewed by	Apoorva Gupta (Quality Manager)	Date	07/04/2025
Approved by	Barun Kumar (Technical Manager)	Date	07/04/2025

History of the Document

Version	Date	Amendment Summary*	Prepared By	Approved By
1.4	30.03.2025	Inclusion of registries section and other editorial changes	Apoorva Gupta	Dr. Vikas Kumar Aharwal
1.3	30/07/2024	Inclusion of Filling guideline for eligible sectoral scope and other editorial changes	Apoorva Gupta	Dr. Vikas Kumar Aharwal
1.2	29/11/2022	Inclusion of Project Trainee, Validator/Verifier Trainee and Local Expert (Country Wise) in roles Table.	Vandana Gupta	Dr. Vikas Kumar Aharwal
1.1	22/07/2021	NA	Ayushi Garg	Vikas Aharwal
1.0	27/03/2020	NA	Ayushi Garg	NA

*Amendment Summary adopted in VKU System on 12.10.2022

Technical Reviwer (TA 4.1)

COMPETENCE STATEMENT

Name	Akhilesh Joshi
Nationality	Indian
Countries of Experience	India, China, Sri Lanka, Bangladesh, Pakistan, Bhutan, Myanmar, Lao PDR, Cambodia, Vietnam, Thailand, Malaysia, Turkey, Georgia, Jordan, Madagascar, Zambia, Malawi, Zimbabwe, Mozambique, Kenya, Angola, Uganda, Tanzania, Nigeria, Guatemala, Mexico
Educational Qualification	MBA (Oil & Gas management) BE (Chemical Engineering)
Year of Experience	17 Years
Area of Expertise	Climate Change & Environment / Industry
Eligible Sectoral Scope	TA 1.1 - Thermal Energy generation from fossile fuels as well as thermal electricity from Solar TA 1.2 - Energy generation from Renewables Energy sources TA 3.1 - Energy demand TA 4.1 – Manufacturing Industries (Cement sector) TA 8.1 - Mining and Mineral Processes TA 10.1 - Mining and Mineral Processes TA 13.1 - Solid Waste and Wastewater He is a **GS Approved Auditor**
Approved for Registries	☒ VCS ☒ SD Vista ☐ Plastic Credit ☒ GS4GG ☒ UCR ☒ UWR ☒ ICR ☒ CERCARBONO ☒ CR-i

Roles approved in VKU

Project Trainee	NO
Validator/Verifier Trainee	NO
Validator	YES
Verifier	YES
Team Leader	YES
Technical Reviewer	YES
Local Expert *(Country Wise)*	YES
TA Expert (1.1, 1.2, 3.1, 4.1, 8.1, 10.1, 13.1)	YES
Financial Expert	YES

Reviewed by	Apoorva Gupta (Quality Manager)	Date	09/04/2025
Approved by	Barun Kumar (Technical Manager)	Date	09/04/2025

Appendix 3. Document reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	UCR	UCR Program Manual	Version 6.1.0, August 2022	UCR website
2.	UCR	General project eligibility criteria and guidance	-	UCR website
3.	UCR	UCR Verification standard	Version 2.0, August 2022	UCR website
4.	UCR	UCR COU standard	Version 07.0	UCR website
5.	CDM	AMS-III.Z: "Fuel Switch, process improvement and energy efficiency in brick manufacture"	Version 06.0	CDM website
6.	CDM	TOOL – 3 "tool to calculate project or leakage C02 emission from fossil fuel combustion TOOL 5 – Tool to calculate baseline, project and/or leakage emission from electricity consumption Tool 7 – Tool to calculate the emission factor for an electricity system, Version 07.0 TOOL 12 - Tool to calculate project and leakage emissions from road transportation of freight version 01.1	TOOL 3 v. 03.0 TOOL 5 v. 03.0 TOOL 7 v. 07.0 TOOL12 v. 01.1	CDM website
7.	CEA	Emission factor as per CEA database "CO2 Baseline Database for the Indian Power Sector"	Version 20.0	Central Electricity authority of India data is publicly available on its website
8.	Starbigbloc Building Material Limited (Project Owner)	Monitoring Report titled "AAC block project by Starbigbloc Building Material Limited" Version 1.0 dated 03/05/2025 Version 1.1 dated 10/05/2025 Version 1.2 dated 16/05/2025		Project Aggregator
9.	Starbigbloc Building Material Limited (Project Owner)	Emission Reduction calculation spread sheet titled "AAC block project by Starbigbloc Building Material Limited" version 1.0 dated 03/05/2025		Project Aggregator
10.	Starbigbloc Building Material Limited (Project	Project Concept Note titled "AAC block project by Starbigbloc Building Material Limited" dated	Version 1.0 23/04/2025	UCR website

	Owner)	23/04/2025 version 1.0		
11.	Starbigbloc Building Material Limited (Project Owner)	Plant logbooks/electronic records relevant to current monitoring period • Purchase of raw materials • consumption of raw materials • transportation of raw materials – quantities and distance of transportation, Records of vehicle category and vehicle operator. Plant annual production records		Starbigbloc Building Material Limited (Project Owner)
12.	Microsoft	Microsoft Dynamics 365 Business Central software used to record and maintain plant records		Starbigbloc Building Material Limited (Project Owner)
13.	Starbigbloc Building Material Limited (Project Owner)	Letter of no double counting declaration / Declaration form for not registering the project under other form of environmental credit for the current monitoring period	Dated 08/05/2025	Project Aggregator
14.	Starbigbloc Building Material Limited (Project Owner)	Suggestion box / complaint box pictures observed onsite	-	-
15.	Arsh Calibration Laboratory Pvt. Ltd	NABL accredited laboratory records/calibration records for the project equipments	24/05/2024	Starbigbloc Building Material Limited (Project Owner)
16.	Bureau Of Indian Standards	BIS licence no. CM/L-7200122185		Star Bigbloc Building Material Pvt. Ltd (PO)
17.	Directorate Industrial Safety and Health Gujrat State	Factory license – dated 01/06/2017	Dated- 01/06/2017	Star Bigbloc Building Material Pvt. Ltd (PO)
18.	Gujrat Pollution Control Board	Consent to operate AWH-79613 dated – 16/06/2016 Consent to operate order no. AWH- 48438 dated 6/02/22	Consent to operate dated – 16/06/2016 Consent to operate order no. AWH-48438 dated 6/02/22	Project Aggregator

19.	Gujrat Pollution Control Board	Consent to establish no: 125268 dated – 31/03/2023	dated – 31/03/2023	Project Aggregator
20.	Gujarat Boiler Inspection department	Certificate for use of boiler Form VI valid up to 11/03/2026	Validity - 11/03/2026	Starbigbloc Building Material Limited (Project Owner)
21.	Bigbloc Construction	Product Catalogue	-	Starbigbloc Building Material Limited (Project Owner)
22.	Starbigbloc Building Material Limited (Project Owner)	Health and safety records	-	Starbigbloc Building Material Limited (Project Owner)
23.	Starbigbloc Building Material Limited (Project Owner)	Invoices or bills of electricity raised by State Electricity Board to PP		Project Aggregator
24.	Starbigbloc Building Material Limited (Project Owner)	FORM -2 Record for each control unit	-	Starbigbloc Building Material Limited (Project Owner)
25.	Starbigbloc Building Material Limited (Project Owner)	Flow chart of process of Manufacturing of AAC Block	-	Project Aggregator
26.	Starbigbloc Building Material Limited (Project Owner)	Attendance sheet of Employees for the current monitoring period as evidence of Total number of employees and worker details		Starbigbloc Building Material Limited (Project Owner)
27.	Starbigbloc Building Material Limited (Project Owner)	Copy of Standard Operating Procedure of • Boiler • Instruction & Daily Check points • Mixing Section • Rising • Cutting Machine (Scrape Slurry Tank Pump) • Segregation (Operator & Fitter)		Starbigbloc Building Material Limited (Project Owner)
28.	Starbigbloc Building Material Limited (Project Owner)	Details of roles & responsibilities for the project activity		Starbigbloc Building Material Limited

				(Project Owner)
29.	ScienceDirect (Elsevier)	https://www.sciencedirect.com/science/article/abs/pii/S0959652616308381 Journal of cleaner production on "carbon footprint of solid clay bricks fired in clamps of India	Dated 01/11/2016	Project Aggregator
30.	Aerocon India	http://aerconindia.com/aac-vs-bricks.html	-	Project Aggregator
31.	2006 IPCC Guidelines for National Greenhouse Gas Inventories	IPCC report of 2006 for NGGI	-	Project Aggregator
32.	VKU Certification Pvt. Ltd.	Onsite visit by VVB	Dated- 06/05/2025	VKU Certification Pvt. Ltd.
33.	VKU Certification Pvt. Ltd.	Interviews during onsite visit and its attendance sheet (VKU.F46W.Attendance sheet for Audit)	Dated- 06/05/2025	VKU Certification Pvt. Ltd.
34.	Starbigbloc Building Material Limited (Project Owner)	Manufacturing procedure	-	Project Aggregator
35.	Google	Google earth software	-	-
36.	VKU Certification Pvt. Ltd.	VKU Certification's Quality Manual System and SOP 4	-	VKU Certification Pvt. Ltd.
37.	Gujarat Government Gazette	Schedule VIII Controller Legal metrology Gujarat state certificate of verification	17/12/2024	Starbigbloc Building Material Limited (Project Owner)

Appendix 4. Clarification request, corrective action request and forward action request

Finding No. 1	Date: 07/05/2025
Finding Type- CAR ☐ CL ☒ FAR ☐	
Stage of finding raised : Desk Review ☒ On-site assessment ☒ Technical Review ☐ Project Review Report by Registry ☐	
Requirement	
UCR MR Template available on UCR website and UCR Verification Standard version 2.0 Aug 2022	
Non-Conformity	
1. Evidence to demonstrate the absence of double counting of emission reductions are not provided. 2. Inappropriate representations (as per number system) of the values of ER found throughout the MR version 1.0 3. MR does not clearly elaborate the roles and responsibilities of the personnel for carrying out the monitoring plan 4. Inconsistencies found in the reporting of the monitoring period in MR version 1.0	
Evidence	
The non-conformance is observed in sections C.3, C.10 of MR version 1.0	
1st Response from PP	Date: 10/05/2025
1. We have attached a letter of assurance to avoid double counting as per the requirement. 2. We have updated the ER value representation in MR as per the number system. 3. We have mentioned the roles and responsibilities of personnel carrying out monitoring as per the requirement. 4. We have ratified the monitoring period in MR.	
Documents provided by PP for review	
1. Letter of Assurance for Double counting.  Double Accounting Signed Declaration. 2. Updated Monitoring Report Version 1.1 dated 10/05/2025.	

1st Review by Assessment Team	Date: 14/05/2025

1. It is confirmed that, the letter of Assurance for “no Double counting” have been assessed and it aligns with UCR standards and Clause 1.8 of the Universal Carbon Registry (UCR) Program Manual (Version 6.1, August 2022), hence accepted. # CLOSED
2. Revised MR has been reviewed and it is confirmed that the values of ER are represented appropriately, hence accepted. # CLOSED
3. section C.10 of the revised MR has been reviewed and It is confirmed that , the roles and responsibilities of the personnel for carrying out the monitoring plan has been provided, hence accepted. # CLOSED

4. The monitoring period stated in the revised Monitoring Report (MR) has been reviewed and found to be consistent throughout the document, defined as 20/12/2018 to 31/12/2024. (and not ending on 31/03/2025) has been corrected. The monitoring plan has been duly revised in accordance with the condition imposed by the Universal Carbon Registry (UCR), acknowledging that the year 2025 is not yet complete. The revised monitoring period are therefore considered acceptable and compliant with UCR requirements. # CLOSED

#**CL01 CLOSED**

Finding No. 2	Date: 07/05/2025
Finding Type- CAR ☒	CL ☐ FAR ☐
Stage of finding raised :	
Desk Review	☒
On-site assessment	☒
Technical Review	☐
Project Review Report by Registry	☐
Requirement	
UCR MR Template available on UCR website and UCR Verification Standard version 2.0 Aug 2022	
Non-Conformity	

1. Section B “Implementation of the project activity” do not align with the UCR MR template
2. List of equipment is not found in this section as per the requirement of section B.1 (b) of UCR MR Template.

Evidence
The non-conformance is observed in the Section B.1 sections of MR version 1.0

1st Response from PP	Date: Date: 10/05/2025

1. We have updated Section B “Implementation of the project activity” as per the requirement of UCR MR template.
2. We have mentioned the list of equipment in section B.1 (b) as per the requirement.

Documents provided by PP for review	
Updated Monitoring Report Version 1.1 dated 10/05/2025.	
1st Review by Assessment Team	Date: Date: 14/05/2025
1. Section B “Implementation of the project activity” has been reviewed and found in line with the UCR MR template, hence accepted. #CLOSED 2. Section B has been assessed and List of equipment has been added and it aligns with the registered PCN and the requirement of section B.1 (b) of UCR MR Template hence accepted. #CLOSED **#CAR 2 CLOSED**	

Finding No. 3	Date: 07/05/2025
Finding Type- CAR ☒ CL ☐ FAR ☐	
Stage of finding raised : Desk Review ☒ On-site assessment ☒ Technical Review ☐ Project Review Report by Registry ☐	
Requirement	
Section 2 and section 3 of UCR Verification Standard version 2.0 Aug 2022	
Non-Conformity	
The following non-conformities have been identified in the submitted ER sheet version 1.0: 1. The sources/references for average transportation distances of all raw materials have not been provided in ER sheet. 2. monthly consumption of the coal is missing from actual consumption data 3. leakage emissions are not based on actual freight transported instead of Raw material consumed 4. In excel sheet data is not linked wherever required (eg “baseline emission sheet – Annual production of AAC block in baseline emission tab) 5. Applicability of CDM tool 5 version 3 is inappropriate to determine the “C02 emission factors considered for ER estimations.	
Evidence	
ER sheet version 1.0 dated 03/05/2025	
1st Response from PP	Date: 10/05/2025
1. We have provided average transportation distances of all raw materials in the ER sheet. 2. We have updated the ER sheet with the actual coal consumption data. 3. We have updated the Leakage emission calculation as per the actual freight transported data for leakage emission due to Raw material transport.	

4. We have linked all data as per the requirement. 5. We have considered data published by the Central Electricity Authority of India for the calculation of Project Emission due to Electricity consumption.The same has been updated in ER.
Documents provided by PP for review
1. Updated ER sheet version 1.1 dated 10/05/2025 2. Raw material Transportation distance.  Raw Material Sources Evidence.pc

1st Review by Assessment Team	Date: 14/05/2025

1. The sources and references for the average transportation distances of all raw materials, as documented in the Emission Reduction (ER) sheet, have been reviewed. The values were cross-verified using Google Maps software and found to be accurate. Accordingly, the values are deemed appropriate and are accepted. #CLOSED

2. The monthly coal consumption data, derived from actual operational records, has been incorporated into the ER sheet. Upon verification, the data was found to be accurate and consistent with supporting documentation. Therefore, it is accepted. #CLOSED

3. The revised ER sheet and Monitoring Report (MR) have been reviewed. It is confirmed that the calculation of leakage emissions from raw material transportation is based on actual freight movement data. The methodology and calculations were found to be accurate and consistent with the applicable standard. Hence, the values are accepted. #CLOSED

4. The revised ER sheet has been examined, and it is confirmed that data points are appropriately linked and traceable to the relevant sources. No discrepancies were identified. Therefore, the dataset is accepted. #CLOSED

5. The project emissions due to electricity consumption, as presented in the revised ER sheet, have been reviewed. The calculation methodology aligns with emission factors published by the Central Electricity Authority (CEA) and Tool 07 – Tool to calculate the emission factor for an electricity system, Version 07.0
6. The approach adopted is conservative. Hence, it is accepted. #CLOSED

CAR 3#CLOSED

Finding No. 4	Date: *15/05/2025*
Finding Type- CAR ☐	CL ☒ FAR ☐
Stage of finding raised :	
Desk Review	☐
On-site/remote/hybrid assessment	☐
Technical Review	☒
Project Review Report by Registry	☐

Requirement
Section 2 and section 3 of UCR Verification Standard version 2.0 Aug 2022
Non-Conformity
Following issues are unclear with respect to ER sheet and MR. • The rationale for selecting only the 2024 T&D loss value is not provided, despite T&D loss data being available from 2018 onwards (as per page 58 of the report). Clarification is required • Baseline emissions are not rounded down as required. Project and leakage emissions are also not rounded up. Rounding has not been applied as per prescribed method. • No records of periodic calibration of weigh bridge used for loading and unloading of trucks.
Evidence
ER sheet and MR version 1.1

1st Response from *PP*	Date: 16/05/2025
• PP has updated the T& D Losses as per the requirement and the same has been updated in the MR and ER sheet as well. • Rounding has been applied and updated in ER sheer and MR as required by the VVB. • The monitoring description has been updated in the MR. Also please find the latest verification record attached herewith	
Documents provided by PP for review	
Weighbridge verification 2024-25. *Revised ER sheet and MR version 1.2*	
1st Review by Assessment Team	Date: 16-05- 2025
• It is confirmed that updated the T& D Losses are in the revised MR and ER sheet, hence accepted. • It is confirmed that Rounding has been applied and updated in revised ER sheet and MR, hence accepted. • All values for Parameters FR Cement /FR Flyash/FR Lime/FR Gypsum /FR Aluminium/FR Coal are compiled through weighing all raw materials upon arrival through a 60T Non automatic weighing Instrument Electronic and recorded in register and subsequently in Office 365 Business Solution. Weigh bridge is verified annually by "Controller Legal metrology Gujarat state and it's last verification has been carried out on 17/12/2024. **CL4 #CLOSED**	

FAR ID	NA	**Section no.**	NA	**Date:** NA
Description of FAR				
No FAR has been raised during current monitoring period hence this section is not applicable				
Project Owner's response				**Date:** NA
NA				
Documentation provided by Project Owner				
NA				
UCR Project Verifier assessment				**Date:** NA
NA				