



Review of Life Cycle Assessment

STRUCTURE ADDRESS

PROJECT NAME

Date: **REPORT GENERATION DATE**

LCA Study Authors: **ASSESSOR NAME**

Peer Reviewer: **CERTIFIER NAME**

Version: 0



Overview

eTool PTY LTD from is conducting an LCA study for **STRUCTURE NAME**, **PROJECT NAME** located at **STRUCTURE ADDRESS**. **CERTIFIER NAME** from eTool PTY LTD is conducting a review of this study.

The Review Process

This critical review has been carried out according to ISO 14040: 2006, clause 7.3.2 and ISO 14044: 2006. The study and has been reviewed against the requirements of EN 15978.

The review focused on the following areas:

- Determine that the study adequately represents the environmental improvements given the background data and methodology
- used Ensure the study meets the requirements of ISO 14044
- Ensure the study meets the requirements of EN15978

The review timeline is outlined below:

Date of Exchange	Item	Author
REQUEST DATE	Requested Certification	ASSESSOR NAME
ASSIGNED DATE	Assigned for Certification	CERTIFIER NAME
REQUEST DATE	Feedback Requested	CERTIFIER NAME
PROVIDED DATE	Feedback Provided	ASSESSOR NAME
CERTIFIED DATE	Certified	CERTIFIER NAME



The review findings along with the study author's responses are documented in the following sections.

General Comments

BREEAM 2018 Third Party Verification

I have completed an independent review of the LCA work produced at Concept Design. The LCA represents the design in consideration and the following LCA options meet the quality requirements.

SuperS_Opt2 (RFCV) Aluminum Composite Panel Roof System

SuperS_Opt3 (EXTWLBR) Curtain Walling Instead of Type A Fire Clay Blockwork

SuperS_Opt4 (EXTWLGZ) Double Brick Ext. Wall, Alu. Glaze Window for Double Brick Ext. Wall SubS_HL_Opt3 (GF) 300mm In Situ Concrete Slab (30%PFA)

SubS_HL_Opt4 (INSL) Slab HD Floor Insulation (XPS) SubS_HL_Opt5 (EXPV) Asphalt Instead of Block Paving SubS_HL_Opt6 (EXPRK) Concrete Paving Slab Instead of Macadam

I confirm that changes are appropriate and significantly different to the baseline design.

I am a competent LCA practitioner and a Specialist user of eToolLCD. I have been working at eTool since 2012 and have completed over 50 LCAs including:

- LCA of a hotel in WA. Primary motivation was to quantify and improve greenhouse gas emissions over the life of the building and assist with planning permission. Completed in 2017
- LCA of a Health Centre in UK. Primary motivation was the BREEAM LCA credit. Completed in 2017
- LCA of a Retail Warehouse in Brazil. Primary motivation was the LEED New Construction LCA credit. Completed in 2018

Please don't hesitate to contact me if you require any further information.

It should be noted that as the review has not been conducted by a panel of experts, publication of the comparative results of the LCA would breach ISO 14044 and EN15978 unless the relevant sections of the standards were addressed, in particular requiring a panel review team for comparative studies.



Detailed Feedback

Temporal Relevancy		
Is the project start date correct?		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS	Passed
If the project start date is not with 2 years of today, do templates reflect the processes employed at the time of the start date		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - project start date is within 2 years of today.	Passed
The grid era (year if available) reflects the chosen start date		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - grid era reflects start date.	Passed
The LCI source is appropriate for the era of the design		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - appropriate LCI source has been used for the era of the design	Passed
Is the estimated service life applicable for the study? Are the attributes that influence design life considered and appropriately selected?		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - Predicted service life of 60 years is required for BREEAM	Passed
Geographical Relevancy		
The correct project address has been entered (down to street level)		
<u>PROJECT NAME</u>	Comment on 03/12/2018 by CERTIFIER NAME: Please include full address.	Passed
	Comment on 12/12/2018 by ASSESSOR NAME: Updated.	
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - update noted.	
The characteristics of the functions match the geographical location of the project (e.g., occupancy matches local statistical occupancy)		
<u>PROJECT NAME</u>	Comment on 03/12/2018 by CERTIFIER NAME: Please update, specially project floor area.	Passed
	Comment on 12/12/2018 by ASSESSOR NAME: Updated.	
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - update noted.	
The uploaded documents (Plans etc.) match the project address		
<u>PROJECT NAME</u>	Comment on 03/12/2018 by CERTIFIER NAME: Please include relevant project documentation.	Passed
	Comment on 12/12/2018 by ASSESSOR NAME: Uploaded.	
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - update noted.	
The references in the largest contributing templates are relevant for the location of the project (e.g., not using a Building Code from Australia to define assumptions for a project in Europe)		
<u>PROJECT NAME</u>	Comment on 03/12/2018 by CERTIFIER NAME: TBC	Passed
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - references in the largest contributing templates are relevant for the location of the project.	
The correct structure address has been entered (down to lot or street number) and falls within the project address		
<u>PROJECT NAME</u>	Comment on 03/12/2018 by CERTIFIER NAME: Please include BREEAM project reference number if available.	Passed
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - BREEAM project reference number has been updated.	
The LCI source is appropriate for the location chosen (same country or continent)		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - BRE IMPACT dataset selected.	Passed
Precision		
The largest contributing template quantities have at least two significant figures entered		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - largest contributing template quantities are within $\pm 10\%$ of quantities shown in design documents.	Passed



The largest contributing EPD quantities have at least two significant figures entered		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: N/A - no EPDs used.	Passed
The largest contributing elements (materials, operational, people and equipment) have at least two significant figures		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - design documentation and quantities are within ±10%	Passed
The values site characteristic values such as cold-water inlet temperature are appropriate (match average ambient temp for location)		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - Site characteristic values are not used as variables in the design.	Passed
Completeness		
The target structural scope defined in the structure only deviates from the default scope where justified		
<u>PROJECT NAME</u>	Comment on 03/12/2018 by CERTIFIER NAME: Please review structural scope (eToolLCD structure level) and select only the items that form part of the scope and have associated templates or elements in the model.	Passed
	Comment on 12/12/2018 by ASSESSOR NAME: Structural scope amended.	
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - updates noted.	
The target operational scope defined in the structure only deviates from the default scope where justified		
<u>PROJECT NAME</u>	Comment on 03/12/2018 by CERTIFIER NAME: Although operational energy and water is not a scope requirement for BREEAM 2018, it is LCA best practice to include them. At eTool we endeavour for all our users to strive for best LCA practices, therefore, we strongly recommend all LCAs to include operational energy/water in their scope. Fortunately, our eTool library has a number of ready-made benchmark CIBSE based templates that can be easily added into any design. Note that they assume today's grid is applied over the life cycle of the design. Please update your design with the suitable template.	Passed
	Comment on 12/12/2018 by ASSESSOR NAME: Energy and water scope included.	
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - updates noted.	
The user entries for materials, people and equipment span the target structural scope defined in the structure		
<u>PROJECT NAME</u>	Comment on 03/12/2018 by CERTIFIER NAME: Please confirm if foundation elements are included like piling or pad footings?	Passed
	Comment on 12/12/2018 by ASSESSOR NAME: Yes, Included.	
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - design documentation and quantities are within ±10%	
The user entries for energy and water span the target operational scope defined in the structure		
<u>PROJECT NAME</u>	Comment on 03/12/2018 by CERTIFIER NAME: Operational energy and water entries have not been included. Please update.	Passed
	Comment on 12/12/2018 by ASSESSOR NAME: Energy and water templates added.	
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - updates noted.	
The useful functions of the building have been included		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - useful building function(s) have been included.	Passed
The common area functions of the building have been included		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - Included within whole building function and templates.	Passed
The useful functions of the building contain templates / elements		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - useful building function(s) contain templates/elements.	Passed
The common area functions of the building contain templates / elements		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: N/A - no common area function as it has been included within the whole building function.	Passed
The life cycle modules included in scope are adequate for the goal of the study (excluded modules must be justified)		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - Life Cycle modules as per LCI Source selected.	Passed



The Indicators included in scope are adequate for the goal of the study (excluded indicators must be justified)		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: Good. Main indicators included as per LCI Source selected.	Passed
The structure contains a "Base" and "Improved" design for the purposes of improving performance		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: N/A - The design being assessed is the base/reference design. It is best practice to create an 'improved design' separately in order to properly document any improvements.	Passed
Technological Relevancy		
The materials elements and templates entered reflect the actual technology employed in the design		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - material elements/templates reflect the actual technology employed in the design.	Passed
The people and equipment elements and templates entered reflect the actual technology employed in the design		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - People and equipment elements/templates reflect the actual technology employed in the design.	Passed
The energy elements and templates entered reflect the actual technology employed in the design		
<u>PROJECT NAME</u>	Passed on 12/12/2018 by CERTIFIER NAME: PASS - energy elements/templates reflect the actual technology employed in the design.	Passed
The water elements and templates entered reflect the actual technology employed in the design		
<u>PROJECT NAME</u>	Passed on 12/12/2018 by CERTIFIER NAME: PASS - Water elements/templates reflect the actual technology employed in the design.	Passed
The default grids selected for the project are representative of the technology used in the actual grids on the project site.		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - Default grids selected are appropriate.	Passed
Consistency		
Both operational water supply and treatment have been included		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - both operational water supply & treatment have been included.	Passed
Where energy generation is employed and there is an expectation the system will export power, the exported power is allocated to module D		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: N/A - no energy generation employed.	Passed
Where energy generation is employed and there is an expectation the system will export power, the exported power goes to an appropriate "Feed in" grid (if available)		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: N/A - no energy generation employed.	Passed
The characteristics of each function have been correctly entered		
<u>PROJECT NAME</u>	Comment on 03/12/2018 by CERTIFIER NAME: To be updated, specially floor area.	Passed
	Comment on 12/12/2018 by ASSESSOR NAME: Updated	
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - characteristics of each function have been correctly entered.	
The floor areas of the functions match the design documentation		
<u>PROJECT NAME</u>	Comment on 03/12/2018 by CERTIFIER NAME: To be updated.	Passed
	Comment on 12/12/2018 by ASSESSOR NAME: Can you explain this, please?	
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - floor areas of the functions are consistent with the design documentation.	
An appropriate functional unit and time scale has been chosen		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - appropriate function unit and time scale has been chosen.	Passed
The functional unit and time scale match the benchmark selected		
<u>PROJECT NAME</u>	Passed on 03/12/2018 by CERTIFIER NAME: PASS - the reference/base design within the same project has been used as the benchmark. Functional unit and time scale of the reference/base design matches the design.	Passed



An appropriate benchmark has been selected to compare against each primary function (Usable spaces)		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: PASS - Base/Reference Design within the project has been used as the benchmark and its' primary functions match.	Passed
The structural scope of the benchmark matches that of the project		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: PASS - Base/Reference Design within the project has been used as the benchmark and its' structural scope matches the project.	Passed
The operational scope of the benchmark matches that of the project		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: PASS - Base/Reference Design within the project has been used as the benchmark and its' operational scope matches the project.	Passed
Where a benchmark is selected from another project, the life cycle modules included in scope are identical		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: N/A - Reference design for options appraisal will be from the same project.	Passed
Where a benchmark is selected from another structure, the structural and operational scope of the structures is identical (preferably the default scope)		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: N/A - No external benchmark used. Reference design is project base design.	Passed
The Structure Type (building or infrastructure) has been appropriately chosen		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: PASS - Structure has been appropriately chosen.	Passed
Reproducibility		
The services of the functions match the design documentation		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: PASS - services of the functions match the design documentation	Passed
Design documentation includes plans and elevations (or 3D model)		
PROJECT NAME	Comment on 03/12/2018 by CERTIFIER NAME: To be included.	Passed
	Passed on 12/12/2018 by CERTIFIER NAME: Good.	
Design documentation includes structural drawings		
PROJECT NAME	Comment on 03/12/2018 by CERTIFIER NAME: To be included.	Passed
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - plans and elevations / 3D model included in documentation	
Design documentation includes a services specification		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: N/A - no services specifications have been made at this stage of the	Passed
Where possible validated and global templates have been used		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: PASS - the design has used validated and global templates where	Passed
Design documentation includes energy simulation report for HVAC		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: N/A - none available at this stage of the project. BAU defaults have been specified in this assessment.	Passed
Has the Assessor provided sufficient design documentation to allow a useful Certification?		
PROJECT NAME	Comment on 12/12/2018 by ASSESSOR NAME: We have uploaded all documents that was used to build this LCA Model. Is there any document that you are specifically?	Passed
	Passed on 12/12/2018 by CERTIFIER NAME: PASS - sufficient design documentation provided.	
The project description adequately describes the site and functional brief of the entire project		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: PASS - Project details have been adequately described.	Passed
The structure description adequately describes the functional brief of the structure along with design goals.		
PROJECT NAME	Passed on 03/12/2018 by CERTIFIER NAME: PASS - Structure information has been adequately described.	Passed
Has a draft Life Cycle Assessment report been provided to capture the progress at the time the review was requested?		
PROJECT NAME	Passed on 12/12/2018 by CERTIFIER NAME: PASS - draft LCA report has been provided.	Passed



eTool PTY LTD
28/11/2018

RE: Review LCA Study of the STRUCTURE NAME, PROJECT NAME located at STRUCTURE ADDRESS.

To Whom it May Concern

CERTIFIER NAME has conducted a review of the STRUCTURE NAME, PROJECT NAME located at STRUCTURE ADDRESS. The study was authored by eTool PTY LTD between the CERTIFICATION REQUEST DATE and CERTIFIED DATE.

BREEAM 2018 Third Party Verification

I have completed an independent review of the LCA work produced at Concept Design. The LCA represents the design in consideration and the following LCA options meet the quality requirements.

SuperS_Opt2 (RFCV) Aluminum Composite Panel Roof System

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I confirm that changes are appropriate and significantly different to the baseline design.

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Please don't hesitate to contact me if you require any further information.

Regards,

CERTIFIER SIGNATURE
CERTIFIER NAME

