



RENEWAL BUILDING GUIDELINE – NON-RESIDENTIAL

Version 1.0

7th AUGUST 2019

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1.0 About GreenRE

GreenRE Sdn. Bhd. is a wholly owned subsidiary of the Real Estate and Housing Development Association (REHDA). The GreenRE Renewal tool has been developed for the purposes as mentioned herein and may be subject to updating and/or modification in the future.

Any sale, modification, reproduction, display or distribution of GreenRE criteria or any copies thereof is not allowed without GreenRE Sdn Bhd's prior written consent. This may be obtained in writing to the following address or via email to info@greenre.org

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2.0 Introduction

The GreenRE assessment scheme was established in 2013 and is a recognized green building rating system tailored for the tropical climate. GreenRE sets parameters and establishes indicators to guide the operation of buildings towards increased energy effectiveness and enhanced continuous environmental performance.

The intent of this Renewal Building Guideline (referred to as “this Guideline”) is to establish environmentally friendly practices for Operations and Maintenance under which building owners and managers can regularly verify their facilities high-performing operations.

This guideline is not intended to abridge safety, health, environmental or related requirements contained in other applicable laws, codes or policies administered by relevant authorities. Where there is a conflict between a requirement of this Guideline and such other regulations affecting the design, construction and operation of the project, the building regulations shall take precedence.

3.0 Revision Log

Revision	Description	Date Effective
1.0	Issued for Implementation	7 th AUGUST 2019

4.0 Renewal of GreenRE Certified Buildings

Upon successful award of final certificate, renewal assessment will be conducted every 3 years to ascertain continuing compliance to GreenRE requirement. Renewal of GreenRE Buildings is a process for qualified GreenRE-certified buildings to be recognised for sustained performance in the area of energy efficiency, water efficiency, operations and management, and indoor environment quality. By satisfying a checklist of performance metrics, such buildings can be renewed to its most recent GreenRE scheme and rating.

This is the first step towards the long-term goal of more fully supporting ongoing performance verification by providing the following:

- A streamlined certification program with simplified submittals for selected rating tools (*ref item 4.1.3*)
- Standardized processes for submittals, certification, and renewal
- A clear and structured renewal process

4.1 Eligibility

4.1.1 The building has not been refurbished / renovated since its last GreenRE assessment

4.1.2 It intends to retain the same GreenRE scheme/version and rating

4.1.3 It was certified with the following rating tools:

- a. GreenRE for New Non-residential Buildings (GRE-NRB)
- b. GreenRE for Existing Non-residential Buildings (GRE-ENRB)
- c. GreenRE for Healthcare Facilities (GRE-HC)
- d. GreenRE for Industrial Facilities (GRE-IND)
- e. GreenRE for Existing Industrial Facilities (GRE-EIND)
- f. GreenRE for Office Interior (GRE-INT)

4.2 Assessment Process

GreenRE Renewal process provides a framework of requirements enabling GreenRE certified buildings to:

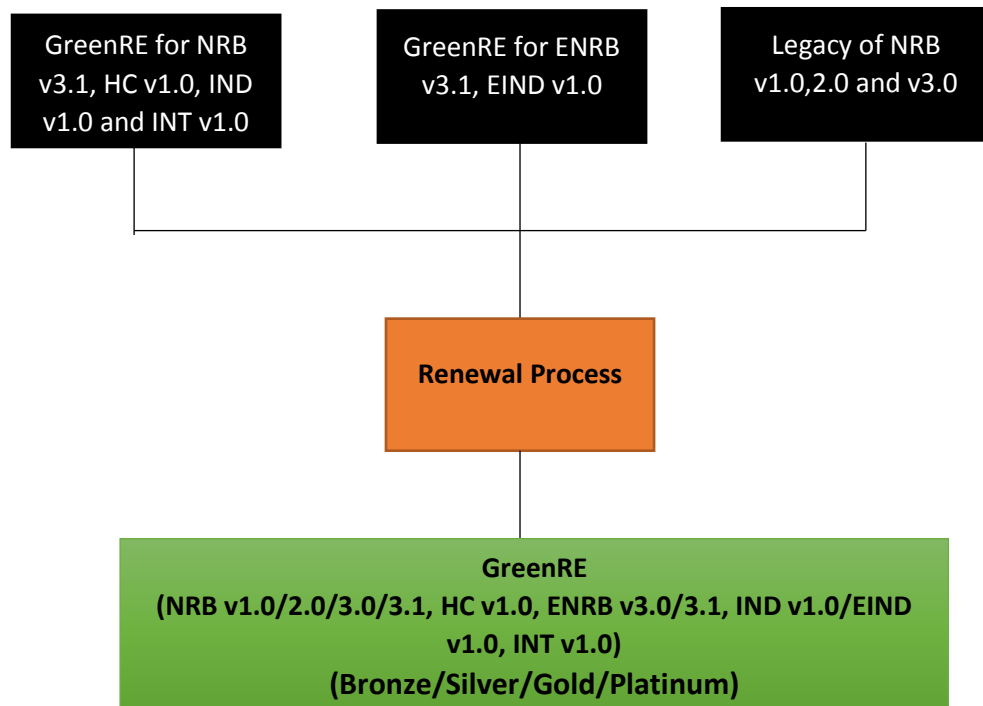
- 4.2.1 Use data to better understand and make decisions concerning energy and water use
- 4.2.2 Develop a policy for more efficient use of resources
- 4.2.3 Set targets and objectives to meet the policy
- 4.2.4 Monitor and measure the results
- 4.2.5 Review the effectiveness of the policy
- 4.2.6 Account for its waste footprint and recycling
- 4.2.7 Continually meet occupants' satisfaction

While it resembles some aspects of a management system, it should not be seen as a substitute or equivalence of the latter.

5.0 GreenRE Renewal Flow Chart

5.1 Renewal of green building certification is applicable for a building that:

- 5.1.1 Retain same GreenRE tool and rating
- 5.1.2 Has not been refurbished or renovated



5.2 Renewal Process

Application



Documentation Review

Document required:

1. Cooling system (Audit report/Chiller Operating System Efficiency)
2. Electricity & Water Bills (3 years)
3. Energy & Water Efficiency Improvement Plan
4. Cycle of Concentration of cooling Tower (from water analysis report)
5. Environmental & Recycling Policy
6. Occupant Satisfaction Survey
7. IAQ Audit Report
8. Lux and Noise report
9. Site greenery report



Site Inspection



Certificate Issuance

Referring to the diagram, building performance metrics and policy statements are submitted to facilitate data entry and document attachment:

- 5.2.1 Building information such as GreenRE application details, GFA, cooling load and etc.
- 5.2.2 Energy audit report for the cooling system certified by Professional Mechanical Engineer or equivalent. Temperature, power and flow-rate readings from the chiller measurement and verification (M&V) instrumentation.
- 5.2.3 Cycle of concentration of cooling tower water, derived from a water analysis report.
- 5.2.4 Three (3) years energy and water use
- 5.2.5 Energy and water improvement plan
- 5.2.6 Environmental, waste management and recycling policy
- 5.2.7 Occupant satisfaction survey
- 5.2.8 Indoor Air Quality (IAQ) audit report by an accredited firm
- 5.2.9 Noise and light levels in various areas of the building (optional)
- 5.2.10 Photographic evidence of site greenery (optional)

This will be followed by an on-site verification of the temperature sensors used for chiller M&V and visual inspection of key installations and equipment such as AHU, filters, M&V instrumentations, cooling towers, waste management, building automation system and water and electrical sub-meters.

Attention will also be paid to symptoms of indoor environmental quality issues such as moisture and condensation, thermal comfort, indoor pollutant control etc.

The assessment will be based on the checklist as described above.

6.0 Renewal Certification Award

Successful applicant will be awarded the GreenRE certificate with its previous GreenRE scheme and rating. Renewal will be written in the certificate for public acknowledge that the building is continued to ascertain performance and commitment to green requirement.

7.0 Document Checklist

Part 1 Energy Efficiency

- Submit Energy Audit or OSE report and meet min. efficiency standard
- On site sensor checks (if previous certification was based on GreenRE NRB V3.1, ENRB V3.1, IND v1.0, EIND v1.0, INT v1.0 and HC v1.0 or points were previously given for these sensors)
- Submit past 3 years building electricity bill (*Provide reasons if deviation is more than 5% over the past the 3 years*)
- Submit details of any changes to installed active equipment

Part 2 Water Efficiency

- Submit past 3 years building water bill (*to provide reasons if deviation is more than 5% over the past the 3 years*)
- Submit updated water efficiency improvement plans
- Submit water treatment report showing cycles of concentration (for cooling tower only)
- Submit details of any changes to installed water fittings

Part 3 Sustainable Operation

- Submit waste recycling reports
- Submit post occupancy surveys (including a summary of the survey results and the corrective actions taken)
- Submit latest endorsed environmental policy
- Submit latest green procurement policy (if applicable)
- Submit photographic evidence of site greenery

Part 4 Indoor Environmental Quality

- Conduct and submit accredited IAQ audit
- Submit Noise and Lux level readings

Project Scorecard

- To submit updated info in renewal submission template and scorecard

In addition to the documents, GreenRE assessor will also be doing site walk/inspection for the building.

Appendix A : GreenRE Renewal Submission Template
Renewal of GreenRE Buildings



Project Details

GreenRE Reference No	
Building name	
Address	
Building Owner	
ESD Consultant	
GreenRE Standard	
Previous GreenRE Reference No.	
Date of last GreenRE Letter Of Award	
Previous GreenRE Rating	
Previous GreenRE Score	
Date of Current GreenRE Assessment	
GreenRE Assessors (Lead)	
GreenRE Assessors (co)	

Building Details:

Type of Building	
GFA (m ²)	
Carpark Area (m ²)	
Air-conditioned Area (m ²)	

Building Key Performance Data:

Type of A/C systems	
Building cooling load (RT)	
Chiller configuration (e.g. 3 nos. x 500RT)	
Cooling load / aircon area (W/m ²)	
Air-conditioning system efficiency (kW/RT)	
Total Building Energy consumption (kWh/yr)	0
EEl (kWh/m ² /yr)	

Verification of Committed Green Features

Project Details

Previous GreenRE Reference No.	0
Date of last GreenRE Letter Of Award	0
GreenRE Standard	0
Previous GreenRE Rating	0
Verification Assessor	



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The list of commitments as listed in the attached Commitment Letter are

GreenRE Criteria	Description	Pre-requisite	Implemented	Variance, if any	Attachment e.g. photo, report	Impact
e.g. 1-2d	Provision of permanent measuring instruments for monitoring of watercooled chilled-water plant					
e.g. 2-4	Implementation of Water Efficiency Improvement Plan					

Verification Results

Category	Points Scored (during assessment)	Final Points Scored (after verification)
Part 1 - Energy Efficiency		
Part 2 - Water Efficiency		
Part 3 – Sustainable Operation & Management		
Part 4 – Indoor Environment Quality		
Part 5 – Other Green Features		
Total	0	0

Project GreenRE rating after verification: **Platinum** Gold Silver Bronze

Summary of OSE/Energy Audit Report

Click to Attach

Use "Insert..Object..Create from File" command if macro execution is disabled

Daily Average Reading	Period		Unit
	Day Time [^]	Night Time [~]	
Cooling Load			Rt
Cooling Load Density (Air-con area)			m ² /Rt
Power Consumption			kW
Chilled water supply temperature			°C
Chilled water return temperature			°C
Chilled water delta T			°C
Chilled water flow rate			l/s
Chilled water flow rate vs cooling load			USgpm/Rt
*Condenser heat rejection			HRt
*Condenser water supply temperature			°C
*Condenser water return temperature			°C
*Condenser water delta T			°C
*Condenser water flow rate			l/s
*Condenser water flow rate vs cooling load			USgpm/Rt
Chiller(s) efficiency			kW/Rt
Chilled water pump(s) efficiency			kW/Rt
*Condenser water pump(s) efficiency			kW/Rt
*Cooling tower(s) efficiency			kW/Rt
Overall chiller plant efficiency			kW/Rt

*Not applicable to air-cooled Chilled Water Plant

~For hotels and other developments with 24-hour operations only, night time shall refer to the period from 11pm-7am

[^] For hotels and other developments with 24-hour operations, day-time shall refer to the period from 7am-11pm; for all other developments, daytime shall refer to the normal operating hours stipulated in clause 6.1.4

Summary of Heat Balance

	Quantity	Unit	Formula
Sum of total electrical energy used		kWh	(A)
Sum of total cooling produced		Rth	(B)
Sum of total heat rejected		Rth	(C)
Chiller Plant Efficiency		kW/Rt	(A) / (B)
Total Heat Balance Data Count		-	(D)
Data Count > + 5% error		-	(E)
Data Count < - 5% error		-	(F)
Data Count within ±5% error		-	(G) = (D) - (E) - (F)
% Heat Balance within ±5% error		%	100 x (G) / (D)

Energy Efficiency Index (3 Years Electricity Bill)

Energy Consumption (1st Year, Baseline)

Month	Total Consumption (kWh)	Tenant's Consumption (kWh)	Landlord's Consumption (kWh)
Yearly Consumption	0	0	0

Energy Consumption (2nd Year)

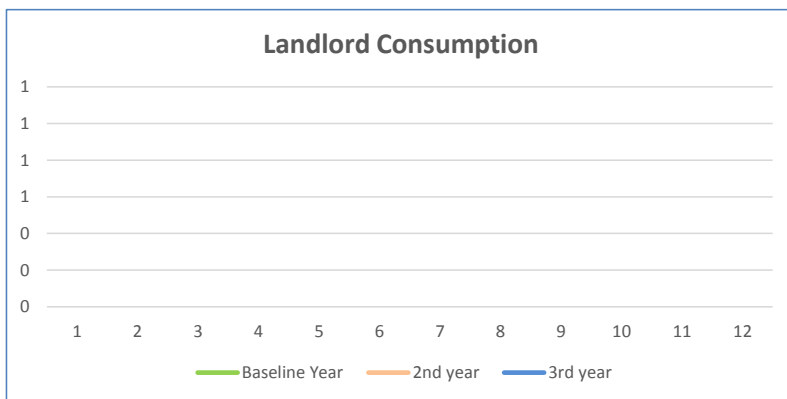
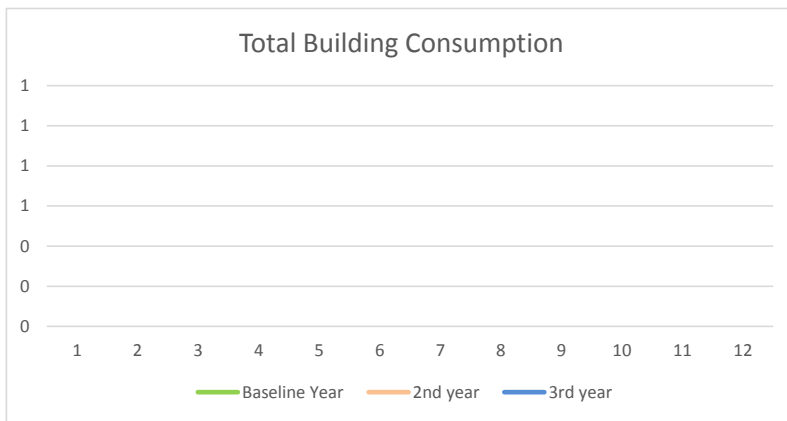
Month	Total Consumption (kWh)	Tenant's Consumption (kWh)	Landlord's Consumption (kWh)
Yearly Consumption	0	0	0
Baseline Improvement			

Energy Consumption (3rd Year)

Month	Total Consumption (kWh)	Tenant's Consumption (kWh)	Landlord's Consumption (kWh)
Yearly Consumption	0	0	0
Baseline Improvement			

Computation of Energy Efficiency Index (EEI) based on area (kW/m²/year)

	Year 1	Year 2	Year 3
Total Building Energy Consumption (kWh)	-	-	-
Gross Floor Area,m² (GFA)	0.0		
Energy Efficiency Index, EEI			
Deviation	Baseline		
Reasons, if deviation > ± 5%	-		



Water Efficiency (3 Years Building Water Bill)

Water Consumption (1st Year, Baseline)

Month	Total Consumption (m ³)	Tenant's Consumption (m ³)	Landlord's Consumption (m ³)
Yearly Consumption			

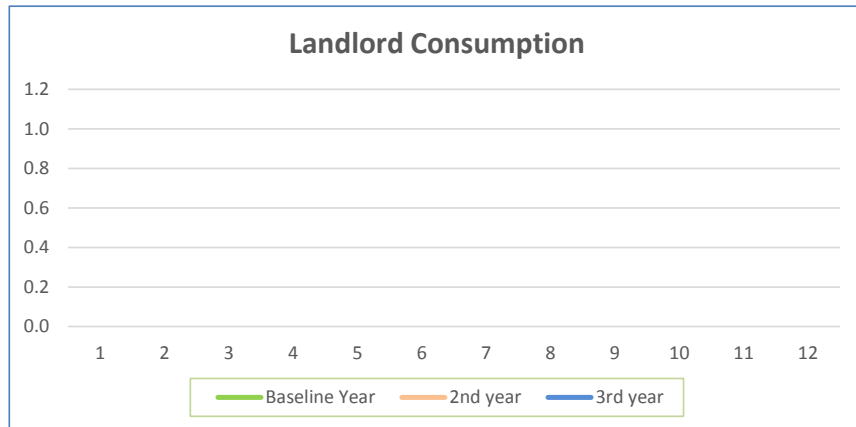
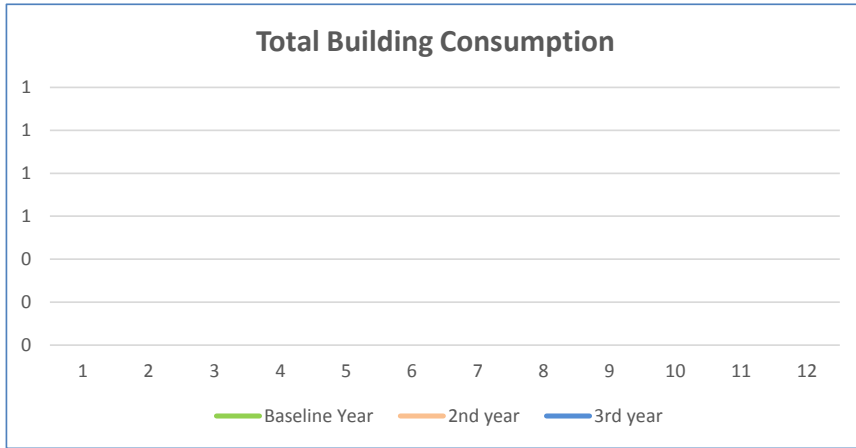
Water Consumption (2nd Year)

Month	Total Consumption (m ³)	Tenant's Consumption (m ³)	Landlord's Consumption (m ³)
Yearly Consumption			
Baseline Improvement			

Water Consumption (3rd Year)

Month	Total Consumption (m ³)	Tenant's Consumption (m ³)	Landlord's Consumption (m ³)
Yearly Consumption			
Baseline Improvement			

	Year 1	Year 2	Year 3
Total Building Water Consumption (m³)			
Deviation	Baseline		
Reasons, if deviation > ± 5%	-		



Energy and Water Improvement Plan

Submission of plans showing intent, measures and implementation strategies to achieve improvement target set against current performance over the next 3 years.

3 Years Energy Efficiency Improvement Target:		%
<i>Assessor's comment:</i>		

Click to attach Energy Improvement Plan

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3 Years Water Efficiency Improvement Target:		%
<i>Assessor's comment:</i>		

Click to attach Water Improvement Plan

Use "Insert..Object..Create from File" command if macro execution is disabled

Cycles of Concentration (for water-cooled chiller plant only)

Submission of cooling tower's water treatment reports showing 7 or better cycles of concentration.

Cycle of Concentration:		Cycles
<i>Assessor's comment:</i>		

Click to attach Water Treatment Report

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Sustainable Operations & Management

Occupant Satisfaction Survey

A post-occupancy evaluation is a survey to gauge occupants' satisfaction on indoor environmental quality and identify corrective actions that will enhance comfort. Please ask your assessor for a survey weblink for this project, which may then be disseminated to occupants. Results will be tabulated automatically, so that FM may view them and record corrective actions taken.

[Alternatively, you may use the attached questionnaire and tabulate the response with the attached result template.](#)



Assessor's comment:

Environmental Policy

Environmental Policy that reflects sustainability goals set for the building and its systems

Assessor's comment:

Waste Recycling Reports

Name of waste recycling company:	
<i>Assessor's comment:</i>	

Click to attach Occupant

Click to attach scanned images of

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Click to attach Environment Policy Statement

Use "Insert..Object..Create from File" command if macro execution is disabled

Click to attach Waste Recycling Reports

Use "Insert..Object..Create from File" command if macro execution is disabled

Indoor Environment Quality

IAQ Audit

Submission of latest IAQ audit report performed by DOSH accredited consultants/companies, stating major areas of concern (e.g. mold

Test Report Number:	
Date Audit was Conducted:	
Name of Accredited Lab:	
<i>Assessor's comment:</i>	

Click to attach IAQ Audit Report

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Lighting Lux Level

Submission of lighting lux levels for various areas, complying with MS1525:2017

Test Report Number:	
Measurements taken by:	
<i>Assessor's comment:</i>	

Click to attach Lux Level Reading

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Noise Level

Submission of noise levels for internal areas.

Test Report Number:	
Measurements taken by:	
<i>Assessor's comment:</i>	

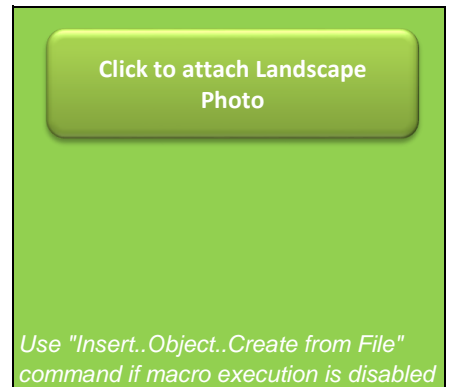
Click to attach Noise Level Reading

Use "Insert..Object..Create from File" command if macro execution is disabled

Greenery Evidence

Submission of Greenery

Greenery Evidence
<i>Assessor's comment:</i>



Appendix B: QUESTIONNAIRE FOR OCCUPANT SATISFACTION SURVEY

A: General Information and Environmental Conditions

Company Name:

Unit No :

Gender :

Male Female

Age group:

<21 Years 21 – 30 Years 31 -40 Years 41-50 Years > 61 Years

On Average, what is the total number of hours per week you spend at your workplace?

<10 Hours <11 -15 Hours 16-20 Hours 21-25 Hours 26-30 Hours >30 Hours

What is the type of your workspace?

Enclosed room Open / Shared Space

Do you work near (<5m) one of the following?

Photocopier/ Printer Server rack /room Pantry Entrance Not Applicable Others

Which of the following do you often use to attain the thermal comfort?

Fans Extra Clothes Less clothes Not Applicable

Do you experience an unpleasant odour?

Regularly Sometimes Never

Do you have any of the following medical conditions?

Asthma	<input type="checkbox"/> Yes, On Medication	<input type="checkbox"/> Yes, Not on Medication	<input type="checkbox"/> No
Allergy	<input type="checkbox"/> Yes, On Medication	<input type="checkbox"/> Yes, Not on Medication	<input type="checkbox"/> No
Sinus	<input type="checkbox"/> Yes, On Medication	<input type="checkbox"/> Yes, Not on Medication	<input type="checkbox"/> No
Migraine	<input type="checkbox"/> Yes, On Medication	<input type="checkbox"/> Yes, Not on Medication	<input type="checkbox"/> No

B: Satisfaction with Indoor Environment

Please indicate your satisfaction levels with the following parameters at work accordingly,

No	Parameters	Level of Satisfaction				
		Very Poor	Poor	Average	Good	Very Good
1.	Thermal Comfort	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Air Quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Lighting Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Daylighting Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Window view to outside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Noise Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Overall Cleanliness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Overall Indoor Environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C: Health Symptoms

Please indicate your experience on the following health symptoms at work accordingly

No	Symptoms	Do you experience this symptom when you are in the building, but feel better or relief after leaving the building?	
		Yes	No
1.	Stuffy Nose	<input type="checkbox"/>	<input type="checkbox"/>
2.	Dry Throat	<input type="checkbox"/>	<input type="checkbox"/>
3.	Cough	<input type="checkbox"/>	<input type="checkbox"/>
4.	Skin Rash /Itchiness	<input type="checkbox"/>	<input type="checkbox"/>
5.	Eye Irritation	<input type="checkbox"/>	<input type="checkbox"/>
6.	Headache	<input type="checkbox"/>	<input type="checkbox"/>
7.	Lethargy	<input type="checkbox"/>	<input type="checkbox"/>
8.	Drowsiness	<input type="checkbox"/>	<input type="checkbox"/>
9.	Dizziness	<input type="checkbox"/>	<input type="checkbox"/>
10.	Nausea /Vomiting	<input type="checkbox"/>	<input type="checkbox"/>
11.	Shortness of breath	<input type="checkbox"/>	<input type="checkbox"/>

D: Comment and/or Suggestion
