جدارة
JADARA
برنامج البناء المستدام
Sustainable Building Program

GORD
المنظمة الخليجية للبحث والتطوير
GULF ORGANISATION FOR RESEARCH & DEVELOPMENT

GSAS
GLOBAL SUSTAINABILITY ASSESSMENT SYSTEM
2007

وزارة البلدية
Ministry of Municipality
State of Qatar دولة قطر

GSAS Technical Guide

Issue 2

GSAS PUBLICATION SERIES

GSAS
PUBLICATIONS SERIES

GSAS TECHNICAL GUIDE

Issue 2

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DISCLAIMER

GSAS was prepared with the assistance and participation of many individuals and representatives from various organisations and the final outcome represents a general consensus. Unanimous support from each and every organisation and individual consulted is not implied. GSAS documentation is revised on a regular basis and as deemed necessary. GORD, through the Center of Excellence GSAS Trust, reserves the right to amend, update and change this manual periodically without prior notice. Where changes in regulations necessitate changes to the criteria assessment, notifications will be issued to all parties involved in the assessment and will be announced on GORD website at www.gord.qa. An appropriate transition period shall be allowed for projects undergoing the assessment process.

As a condition of use, users covenant not to sue, and agree to waive and release GSAS Trust and its members from any and all claims, demands and causes of actions for any injuries, losses and damages that users may now or hereafter have a right to assert against such parties as a result of the use of, or reliance on GSAS.

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ABBREVIATIONS

AAN	Audit Advisory Notice
AHP	Analytic Hierarchy Process
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
BREEAM	Building Research Establishment Environmental Assessment Method
CASBEE	Comprehensive Assessment System for Built Environment Efficiency
CDA	Conformance to Design Audit
CEN	European Committee for Standardization
CEPAS	Comprehensive Environmental Performance Assessment Scheme
CMP	Construction Management Plan
CO_2	Carbon Dioxide
EPC	Energy Performance Coefficient
EPL	Energy Performance Label
EU	European Union
GCT	Global Carbon Trust
GORD	Gulf Organisation for Research & Development
GSAS	Global Sustainability Assessment System
ABCP	Accredited Building Commissioning Professional
AEA	Accredited Energy Auditor
AFMP	Accredited Facility Management Professional
AWMP	Accredited Waste Management Professional
GSAS-D&B	GSAS Design & Build
GSAS-CM	GSAS Construction Management
GSAS-OP	GSAS Operations
GSAS-D&B CGP	GSAS Design & Build Certified Green Professional
GSAS-CM CGP	GSAS Construction Management Certified Green Professional

GSAS-OP CGP	GSAS Operations Certified Green Professional
GSAS-D&B SP	GSAS Design & Build Service Provider
GSAS-CM SP	GSAS Construction Management Service Provider
GSAS-OP SP	GSAS Operations Service Provider
ISO	International Organization for Standardization
LEED	Leadership in Energy and Environmental Design
LOC	Letter of Conformance
MENA	Middle East and North Africa
NEN	Netherlands Standardization Institute
PCR	Pre-Certification Review
QSTP	Qatar Science and Technology Park
SEER	Seasonal Energy Efficiency Ratio
WPC	Water Performance Coefficient
WPL	Water Performance Label

PREFACE

Global Sustainability Assessment System (GSAS) is the first performance-based system in the Middle East and North Africa (MENA) region, developed for assessing and rating buildings and infrastructure for their sustainability impacts. The primary objective of GSAS is to create a sustainable built environment that minimizes ecological impact and reduces resources consumption while addressing the local needs and environmental conditions specific to the region. GSAS adopts an integrated lifecycle approach for the assessment of the built environment including design, construction and operation phases.

The 4th Edition of GSAS launched in 2019 has capitalized on 10 years of experience and 'hands-on' implementation of GSAS, richness and capacity gained from the assessment of numerous and various building typologies totalling more than 100,000,000 square feet of built-up area and more than 1,500,000,000 square feet of district masterplanning, and multi-disciplinary research projects conducted in collaboration with renowned world-class institutes on various aspects of sustainability in the built environment.

GSAS supports the stakeholders of building/infrastructure projects with manuals and tools, to help the implementation of the certification processes throughout the various phases of project development i.e. from predesign to post-occupancy.

The purpose of this manual is to provide practitioners, project owners, consultants, contractors and facility operators with necessary generic information in addition to practices and procedures for GSAS certifications. The information in this guide is presented with the aim of guiding GSAS practitioners and generate awareness among GSAS non-practitioners. The processes, protocols and resources described in this guide facilitate understanding on how the ratings and certifications are established. The guide provides the requirements and credentials needed for the successful implementation of the rating system.

The information presented in this guide is divided into three parts. Section (I) introduces the users to generic information about GSAS. Section (II) provides practitioner information on GSAS certification types. Section (III) provides requirement and supplementary information related to implementation of GSAS certification programs.

The guide also provides useful information on how to become a GSAS Certified Green Professional (GSAS-CGP) and an authorized GSAS Service Provider. Information on the required credentials to maintain the practice of the profession and service can also be found in this guide.

In case of any subjectivity in the rules and procedures, final interpretation of the provisions in this guide rests solely with GSAS Trust, the certifying body of GORD. Therefore, users of this guide are further advised to consult with GSAS Trust for any clarifications regarding the information contained in this guide.

This manual should be read in conjunction with all other relevant GSAS manuals and publications.

SECTION (I)

ABOUT GSAS

CHAPTER 1 GSAS OVERVIEW

1.1 INTRODUCTION

GSAS is the Middle East's first integrated and performance-oriented sustainability assessment rating system for the construction industry developed by GORD in 2007 in collaboration with the TC Chan Center at the University of Pennsylvania, and the School of Architecture at the Georgia Institute of Technology, USA and other reputed houses of expertise.

GSAS certifications aim to evaluate the sustainability of the built environment through providing a performance-based approach for assessment, considering the reduction of the environmental impacts of the built environment by adopting the best practices available in the delivery of the project sustainability requirements throughout the entire life cycle of the built environment i.e. from design through construction to operations. GSAS aims to promote the adoption of sustainability into regulatory requirements and building codes, hence making sustainability business as usual. GSAS certification programs allow professionals to gain a deeper understanding of GSAS fundamentals, tools and techniques, thereby extending the capabilities of individuals and companies. Dissemination of this knowledge is key to building the sustainable built environments of tomorrow.

GSAS manuals are revised on a regular basis to reflect all technical changes and provide relevant information to keep conversant based on best practices, GSAS Trust experience and GSAS users feedback. With GSAS at its core, GORD has built a comprehensive continuum of sustainability that encompasses everything from assessing and rating built-environments to educating and certifying professionals, setting industry benchmarks and researching new breakthroughs in the field.

1.2 GSAS OBJECTIVES

The primary objective of GSAS is to create a sustainable built environment, considering the specific needs and context of the region. This objective includes creating a better living environment, minimizing resource depletion and consumption and reducing environmental degradation due to the rapid pace of urbanization taking place in this era. These objectives, coupled with the increasing evidence of the effects of climate change on a global level, have contributed significantly to the unprecedented pace of adaptation to sustainability practices, both in the developed world and developing nations.

1.3 GSAS FRAMEWORK DEVELOPMENT

1.3.1 In the entirety of this document, GSAS refers to the Global Sustainability Assessment System, the first performance-based system in the MENA region, developed for rating green buildings and infrastructures in all building phases.

1.3.2 The groundwork of GSAS began with a comprehensive review of best practices from established international and regional sustainability rating systems.

1.3.3 GSAS is based on a bottom up approach that is followed to allow for a seamless integration of specific requirements of the country with high level and multi-dimensional sustainability goals.

1.3.4 2007 marked the start of the development of GSAS Framework (refer Figure 1). It then went through four stages of the development process up until 2009. The development process conducted a rigorous technical analysis by deploying a rule-based process of analysis and feedback based on technology developments and market feedback.

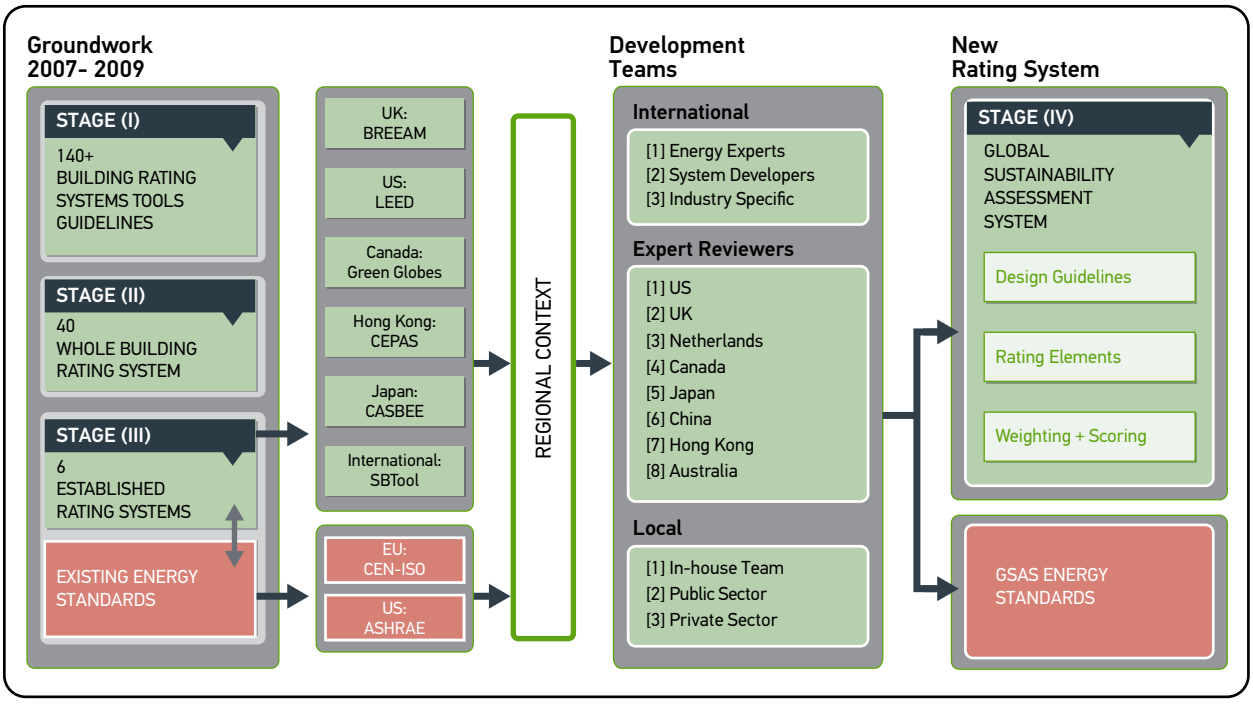


Figure 1: Development of GSAS Framework

1.3.5 Stage (I) of the development process involved the examination of more than 140 building rating systems, tools, guidelines and standards around the globe. The applicability of the sustainability rating systems, tools, and guidelines to the context of the region were evaluated in terms of the following parameters:

- Ecology & Climate
- Materials & Resources
- Policies & Laws
- Culture & Heritage

Initial assessment lead to the exclusion of a great deal of collected references and materials due to their limited scope, non-applicability and inadequate technical content.

1.3.6 Stage (II) of the development process focused on narrowing down the choice to 40 whole building rating systems which were further analyzed based on their scope, applicability, adaptability, transparency and relevance.

1.3.7 Further investigation of the chosen systems revealed that information for many of the frameworks were inaccessible in the public domain. Systems which did not provide information publicly were screened from the next stage of the analysis.

1.3.8 The main outcome of this stage indicated that several systems were not original and could be considered customized versions of well-established systems. Hence, this resulted in narrowing down the list to 6 well-established rating systems and 2 Energy standards. The six rating systems were BREEAM from the UK, CASBEE from Japan, CEPAS from Hong Kong, Green Globes from Canada, LEED from the USA, and the International SBTool, where the Energy standards were CEN-ISO developed in Europe and ASHRAE from the USA.

1.3.9 Stage (III) of the development process began with a thorough review analysis of the selected frameworks. Criteria were established to rate the credibility and effectiveness of the 6 chosen systems methods and structures. Using the Pacific Northwest Laboratory's Sustainable Building Rating Systems Summary as a guideline, each of the 6 systems were reviewed using the following criteria:

- Development: The ideal rating system makes use of the Life-Cycle Analysis, consensus-based standards and expert opinion.
- Usability: Any procedure applied must be easy and simple to use.
- System Maturity: A proven track record is an indication that the tool is effective.

- Technical Content: The system needs to address the environmental areas of concern to the region through its site optimization, energy and water use, environmental quality and materials selection.
- Measurability & Verification: A defined, standardized method for collection and analysis is required for the efficacy of the tool.
- Communicability: The results should be easily understood.

1.3.10 Stage (IV) of the development process evaluated the achievements and limitations of the rating systems. The result of the evaluations yielded the unique GSAS framework, evaluation methodologies, weightings and scorings, translated in GSAS categories and criteria.

1.3.11 GSAS identifies several sustainability challenges in the built environment (refer Figure 2). The challenges include air pollution, land use contamination, fossil fuel depletion, water depletion, water pollution, materials depletion, human discomfort and sickness and climate change. These challenges were used to guide the identified framework to ensure robustness in mitigating the adverse environmental impacts of the built environment.

Figure 2 : Environment Challenges Resulting from Built Environment

1.3.12 GSAS framework is comprehensive and designed to follow an integrated life cycle approach to improve the sustainability performance of the built environment. GSAS addresses the sustainability impacts during the design, construction and operation stages of buildings and infrastructure projects (refer Figure 3).

1.3.13 The sustainability goals of the built environment were first identified to be those which can contribute to minimize the negative environmental sustainability impacts pertinent to the region.

1.3.14 These goals were then translated into what is known as the eight categories of GSAS that define performance to be achieved to minimize the urbanization impact on environmental sustainability and improve human well-being.

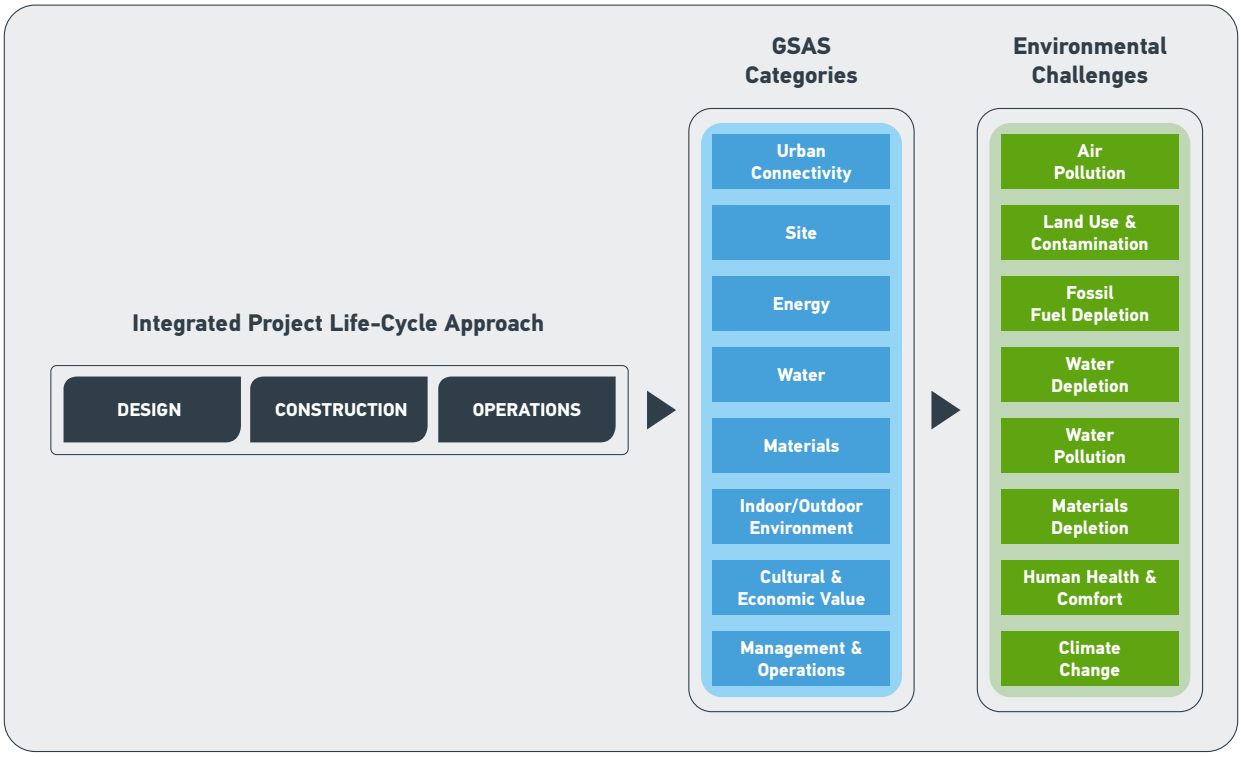


Figure 3 : Integrated Life Cycle Approach of GSAS

1.4 GSAS CATEGORIES

1.4.1 GSAS framework addresses eight categories of macro and micro level aspects for a multidimensional focus on sustainability. These categories comprise of: Urban Connectivity; Site; Energy; Water; Materials; Indoor/Outdoor Environment; Cultural & Economic Value; and Management & Operations (refer Figure 3).

1.4.2 Each GSAS Category is associated with a direct impact on environmental sustainability and/or human well-being and provides indicators to measure different associated aspects.

1.4.3 These categories are then sub-divided into specific criteria that measure and define the individual issues. Categories, criteria, and measurements are defined to be performance-based and quantifiable, as far as possible.

1.4.4 Best practices pertaining to the implementation of measures under each criterion are provided as guidelines in GSAS Guidelines manuals.

1.4.5 The Analytic Hierarchy Process (AHP) is used to determine the relative importance or weights of GSAS Categories. GSAS uses the concept of relative impact as a measure of weighting for each criterion within a category (refer Figure 4).

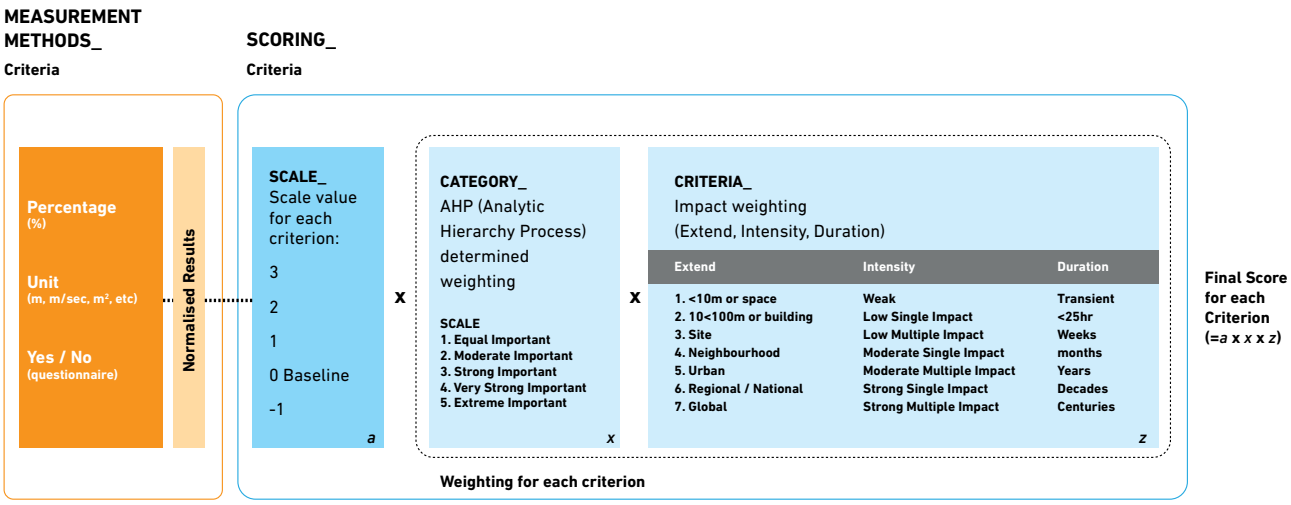


Figure 4: GSAS System Weighting Methodology

1.4.6 The AHP method provides a comprehensive and rational framework for structuring a problem, representing and quantifying its elements, relating those elements to overall goals and evaluating alternative solutions. It is used throughout the world in a wide variety of decision-making situations, in fields such as government, business, industry, healthcare and education.

1.4.7 AHP is a systematic decision-making method whereby stakeholders determine the relative importance or weights of a series of factors by comparing one factor to another. The comparisons are carried out on a 9-point intensity scale for all unique pairs of factors.

1.4.8 An AHP analysis involved the three following steps:

Step 1. Defining factors based on the main objective of the exercise

Step 2. Determining the relative importance of each factor by a pair-wise comparison of the views of the key stakeholders' representatives

Step 3. Verifying logical consistency between factors

1.5 GSAS CRITERIA

1.5.1 Each criterion in GSAS is provided with explanations of the measurement principle and method that can be found in the guidelines and assessment manuals.

1.5.2 Each criterion requires certain measurements and verification to demonstrate compliance.

1.5.3 For each of GSAS assessment manuals, each criterion is provided with explanations of the submittal requirements. The text on each criterion specifies a process for measuring the individual aspect that has an environmental impact and supporting it with the required documentation. A level is then awarded to each criterion based on the achievement as per the pre-defined rating mechanism.

1.5.4 Incentive weights are allocated for certain GSAS criteria in different GSAS certification schemes to encourage additional effort to implement best practice in sustainability. For example, "Renewable Energy" criterion in GSAS-D&B, "Workers' Accommodation" criterion in GSAS-CM and "Sub-metering for Energy/Water" in GSAS-OP.

1.5.5 Incentive weights are also allocated in certain instances where projects engage professional services from providers accredited by GSAS Trust including the following:

- Accredited Energy Auditor (AEA)
- Accredited Building Commissioning Professional (ABCP)
- Accredited Facility Management Professional (AFMP)
- Accredited Waste Management Professional (AWMP)

1.6 GSAS SUBMITTALS

1.6.1 The project is required to submit the documentations required for each criterion to demonstrate compliance.

1.6.2 Submittals including drawings, schematics, sketches, design reports, simulation reports and vendor's data are required to be developed in the appropriate format and dimensions.

1.6.3 All submittals are required to highlight the information supporting the input values in GSAS calculators and plans.

1.6.4 All submittals are to be saved in clear and legible copies.

1.6.5 Submittals involving calculations are to be developed in appropriate formats.

1.7 GSAS SCORING SHEETS

1.7.1 GSAS scoring sheets are useful sensitivity analysis tools to enable projects to compute the anticipated criteria levels, project score and corresponding certification rating under multiple scenarios. The tool provides the user with the opportunity to target, adjust and amend the level of each individual criterion to predict the final rating.

1.7.2 GSAS scoring sheets are available for all certification types and their different schemes. GSAS scoring sheet lists all categories, the criteria under each category, their weight and target level.

1.7.3 Criteria levels are input in GSAS scoring sheet, allowing the user to conduct a sensitivity analysis to predict the overall rating of the project (refer Figure 5 & 6).

GLOBAL SUSTAINABILITY ASSESSMENT SYSTEM

GSAS DESIGN & BUILD 2019 (4th Edition)

SCORING SHEET FOR BUILDING TYPOLOGIES

gend:

	Input
	Not Applicable

oject Information	
ıte:	
oject ID:	
oject Name:	
oject Location:	
oss Area (m^2):	
heme:	Homes

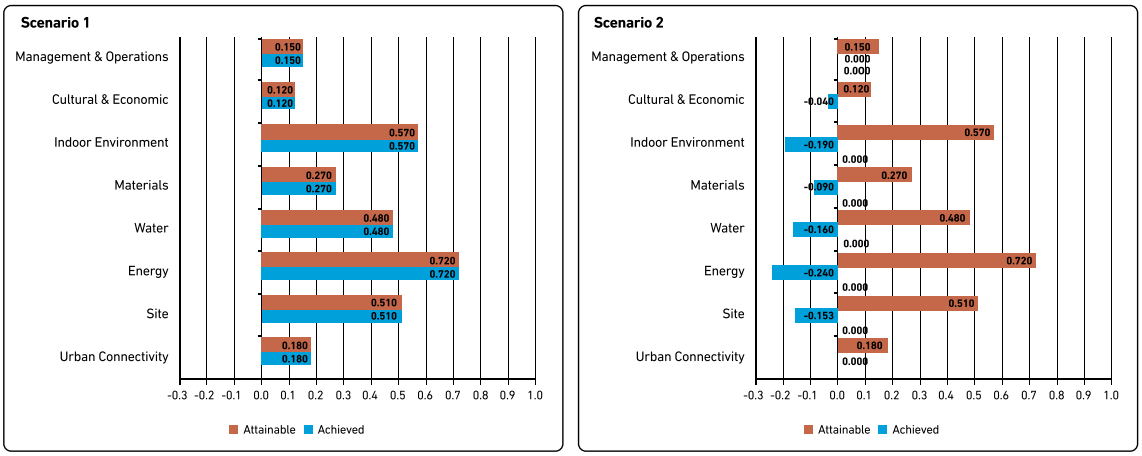
RBAN CONNECTIVITY

Criteria	Additional Rewards	Weights %	Incentive Weights (%)	Scenario 1 Levels	Scenario 2 Levels	Scenario 1 Scores	Scenario 2 Scores
C.1] Proximity to Infrastructure		2.38%		3	0	0.071	0.000
C.2] Proximity to Amenities		2.49%		3	0	0.075	0.000
C.3] Load on Local Traffic Conditions		N/A		3	0	N/A	N/A
C.4] Public Transportation		1.83%		3	0	0.055	0.000
C.5] Green Transportation		N/A		3	0	N/A	N/A
C.6] Neighborhood Acoustics		0.30%		3	0	0.009	0.000
		7.00%	**0.00%**			**0.210**	**0.000**

Figure 5: Scoring Sheet Inputs

Category	Scenario 1 - Overall Score 3.000	Scenario 2 - Overall Score -0.872
Urban Connectivity	0.180	0.000
Site	0.510	-0.152
Energy	0.720	-0.240
Water	0.480	-0.160
Materials	0.270	-0.090
Indoor Environment	0.570	-0.190
Cultural & Economic Value	0.120	-0.040
Management & Operations	0.150	0.000
Rating Achieved	**6 Stars**	**Certification denied**

Categories Achieved Score vs. Attainable Score



Project Overall Scores & Ratings

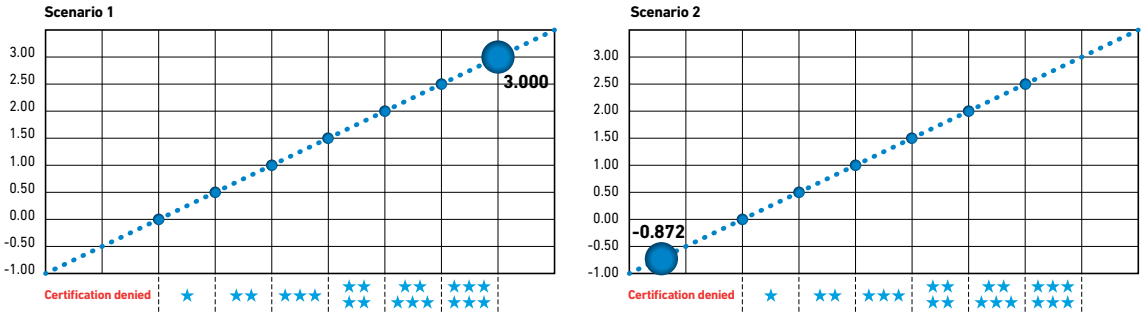


Figure 6: GSAS Rating as Indicated in GSAS Scoring Sheet

1.7.4 The graphical representation provided in GSAS scoring sheet displays the score earned for each category, combined total aggregated score, and the rating achieved by the project.

1.7.5 The Bar chart illustrates the score achieved and the maximum attainable score for each category (refer Figure 7).

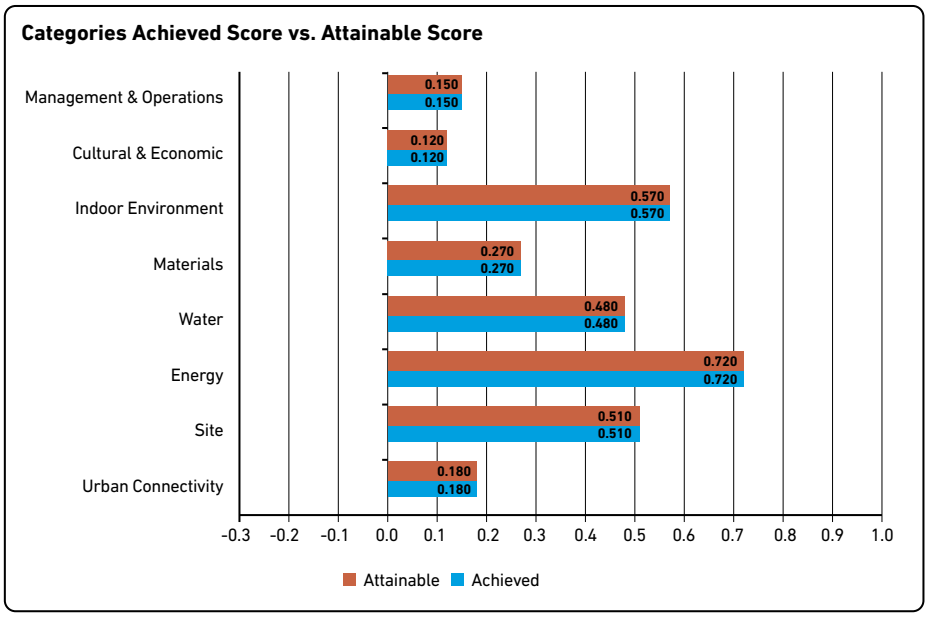


Figure 7: Bar Chart as Indicated in GSAS Scoring Sheet

1.7.6 The Line chart displays GSAS overall score and star rating (refer Figure 8).

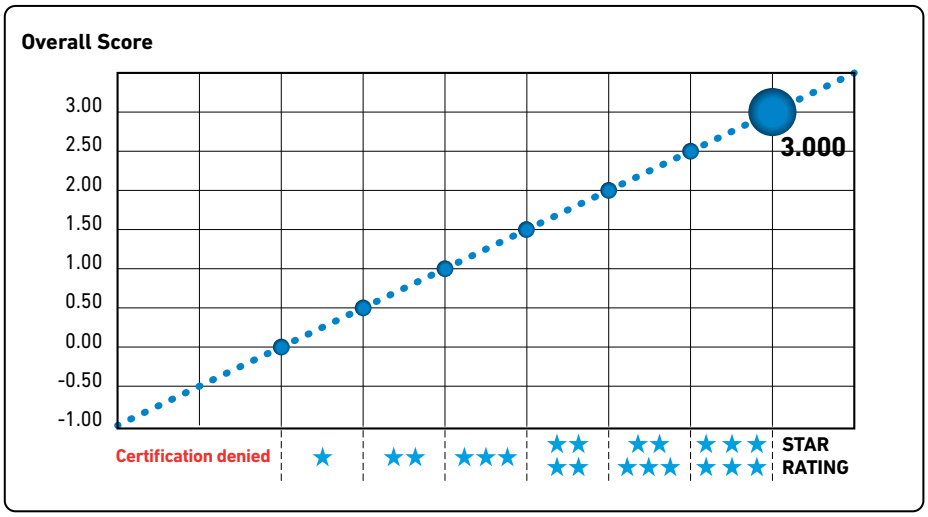


Figure 8: Line Chart as Indicated in GSAS Scoring Sheet

1.8 GSAS RATING MECHANISM

1.8.1 GSAS Weights

GSAS Weight indicates the relative importance of the criterion in percentage, allocated by GSAS Trust following a comprehensive AHP exercise. Overall weight of each category is determined by aggregation of the individual weights of criteria belonging to that category.

Figure 9 shows the relative weights of GSAS categories.

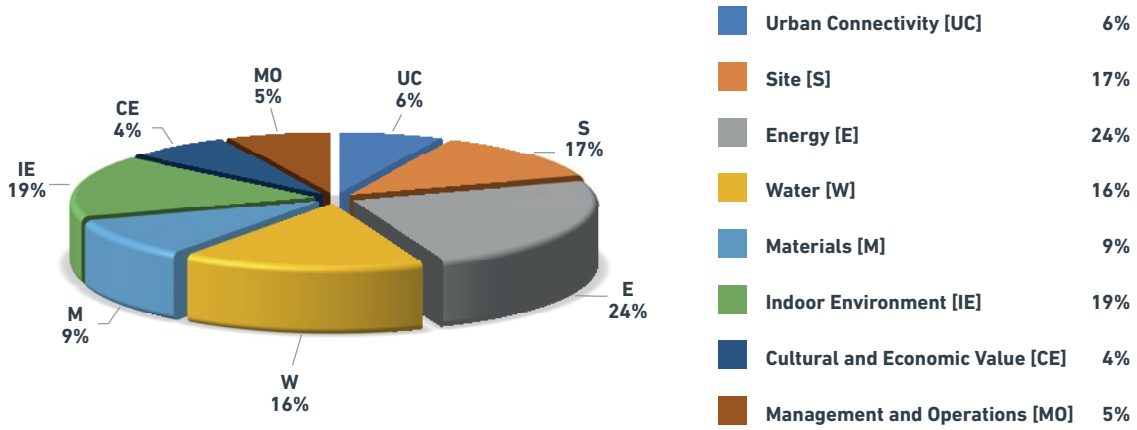


Figure 9: GSAS-D&B Categories Weights

1.8.2 GSAS Levels

GSAS Level indicates the degree of compliance with the requirements of the criterion and ranges from lowest -1 to highest 3. The level is confirmed for a criterion by GSAS Trust after verification.

1.8.3 GSAS Scores

Each criterion has a score of numeric value which is calculated by multiplying the percentage weight by the criterion level. The score is automatically calculated by GSAS scoring sheet provided by GSAS Trust. It is used to calculate the overall score for the project.

1.8.4 GSAS Ratings

1.8.4.1 GSAS Rating indicates the overall achievement of the project and is determined by summing up the individual scores of all criteria.

1.8.4.2 Each certification type has a unique rating nomenclature.

1.8.4.3 GSAS Design & Build has six ratings based on number of stars ranging from 1 to 6.

1.8.4.4 GSAS Construction Management has five ratings where "Class D" is the lowest and "Class A★" is the highest.

1.8.4.5 GSAS Operations has five ratings with Bronze as the lowest and Diamond is the highest rating.

1.8.4.6 More details on Weights, Levels, Scores and overall Ratings are provided in the subsequent sections.

1.9 GSAS CALCULATORS

1.9.1 GSAS calculators are unique and user-friendly computational tools developed to perform the required calculations to generate the criterion level.

1.9.2 Calculations are based on results of normative measurements provided in order to evaluate the overall performance of the project under the relevant GSAS schemes. An example of one of GSAS calculators is shown in Figure10.

GLOBAL SUSTAINABILITY ASSESSMENT SYSTEM

GSAS DESIGN & BUILD 2019 (4th Edition)

[UC.1] Proximity to Infrastructure Calculator

Issue No. 1 - January 2019

Project Information

Date of Submission	15-01-2019
Project ID	QA000-000122
Project Name	Project XY
Scheme	Hospitality

Legend

- User Input
- Reference Information
- Calculated Values
- Fixed Values

Part 1: Primary Infrastructure	Status
Electricity - Low/High Voltage Grid	Planned
Water - Water Main Line	Available
Transportation - Local Road	Available
Drainage - Sewer Line	Available
Communication - Phone Lines	Available
Primary Infrastructure Networks Indicator (X)	**4.5**

Part 2: Secondary Infrastructure	Status
Storm Water Drainage Solutions	Not Available
Domestic Natural Gas	Not Available
Access to Highway	Not Available
Street Lighting	Not Available
Subway/Metro Station	Not Available

Figure 10: Sample GSAS Calculator

1.10 GSAS ENERGY STANDARDS

1.10.1 The energy assessment methodology is composed of performance-based normative calculations that follow the framework of the CEN-ISO standards and NEN standards.

1.10.2 Based on the CEN-ISO framework, energy is assessed from four perspectives namely, Thermal Energy Demand, Energy Use, Primary Energy and CO_2 Emissions.

1.10.3 The normative calculation method based on the CEN-ISO standards is increasingly applied in EU countries for building energy regulatory purposes and is adopted in the development of GSAS Energia Suite™.

1.10.4 The normative calculation procedure introduced in GSAS has distinctive advantages: ease of calculation; transparency; robustness and reproducibility.

1.11 GSAS ENERGIA SUITE™

1.11.1 GSAS Energia Suite™ require only the minimum input parameters and are transparent with the CEN-ISO calculation method.

1.11.2 GSAS Energia Suite™ calculates the building's thermal energy demand and energy use, in addition to the primary energy and CO_2 emissions due to primary energy supply and delivery network.

1.11.3 GSAS Energia Suite™ translates the calculated energies and emissions into effective Energy Performance Coefficient or EPC values in relation to applicable GSAS benchmarks and then generates the corresponding criterion level.

1.11.4 The characteristics of GSAS Energia Suite™ include the following distinctive benefits and features:

- Enables user input values through a simple interface
- Performs complex algorithms, equations and calculations seamlessly
- Avoids the need for the use of other complex software packages

1.12 GSAS WATER SUITE™

1.12.1 GSAS Water Suite™ calculates the building's water consumption. GSAS Water Suite™ translates the calculated water consumption into effective Water Performance Coefficient (WPC) values and Water Performance Label (WPL) in relation to applicable GSAS benchmarks.

1.13 GSASgate™

GSASgate™ is an online portal for managing the submission, assessment and certification processes of projects seeking GSAS accreditations. *GSASgate*™ is an integrated system, catering for the needs of all stakeholders involved in GSAS certification process, including project developers/owners, consultants, contractors, government entities and GSAS Trust. A user manual for *GSASgate*™ is available for download from https://www.www.gsas.qa/GSASgate_Manual.pdf (refer Figure 11).

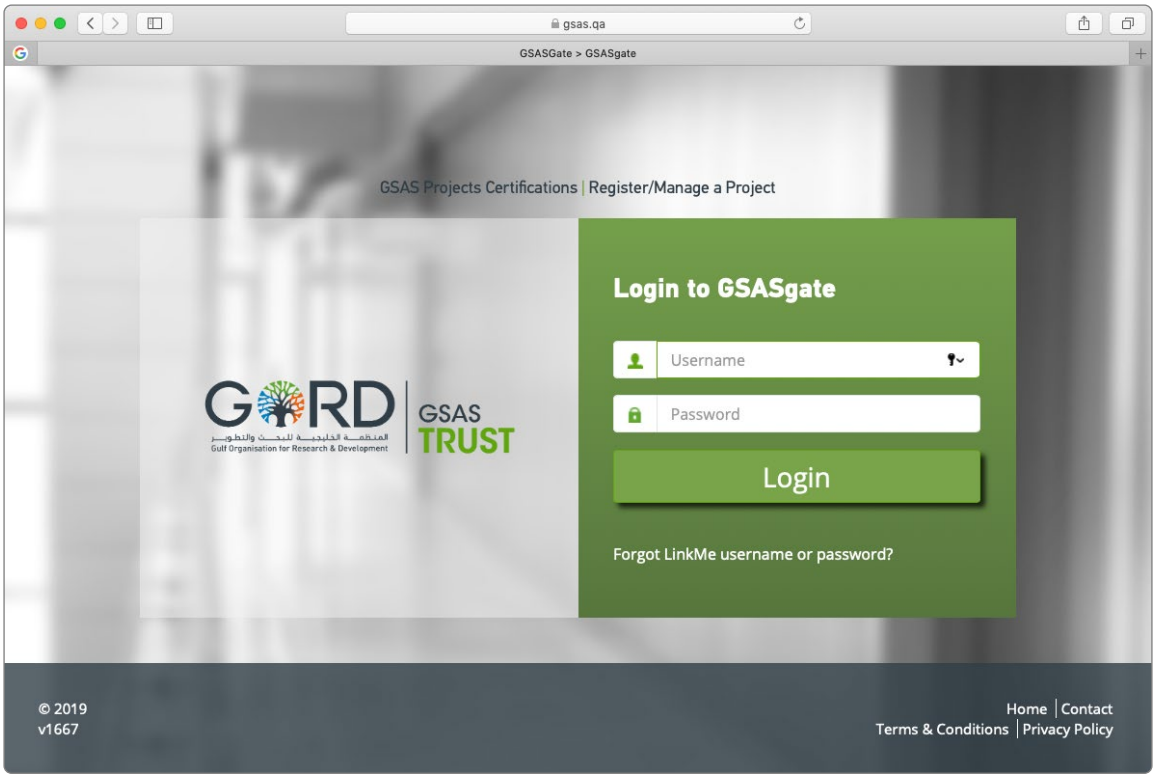


Figure 11: GSASgate™

1.14 GORD WEBSITE

GORD website at www.gord.qa is the online portal of the Gulf Organisation for Research and Development. It contains web pages that provide information related to GSAS Trust standardisation and certification, GORD Academy education and membership, GORD Institute research and development and Global Carbon Trust (GCT). It also includes web pages that provide quick access to the resource center, events and workshops, media center, blog, *LinkMe*™ and *GSASgate*™ (refer Figure 12).

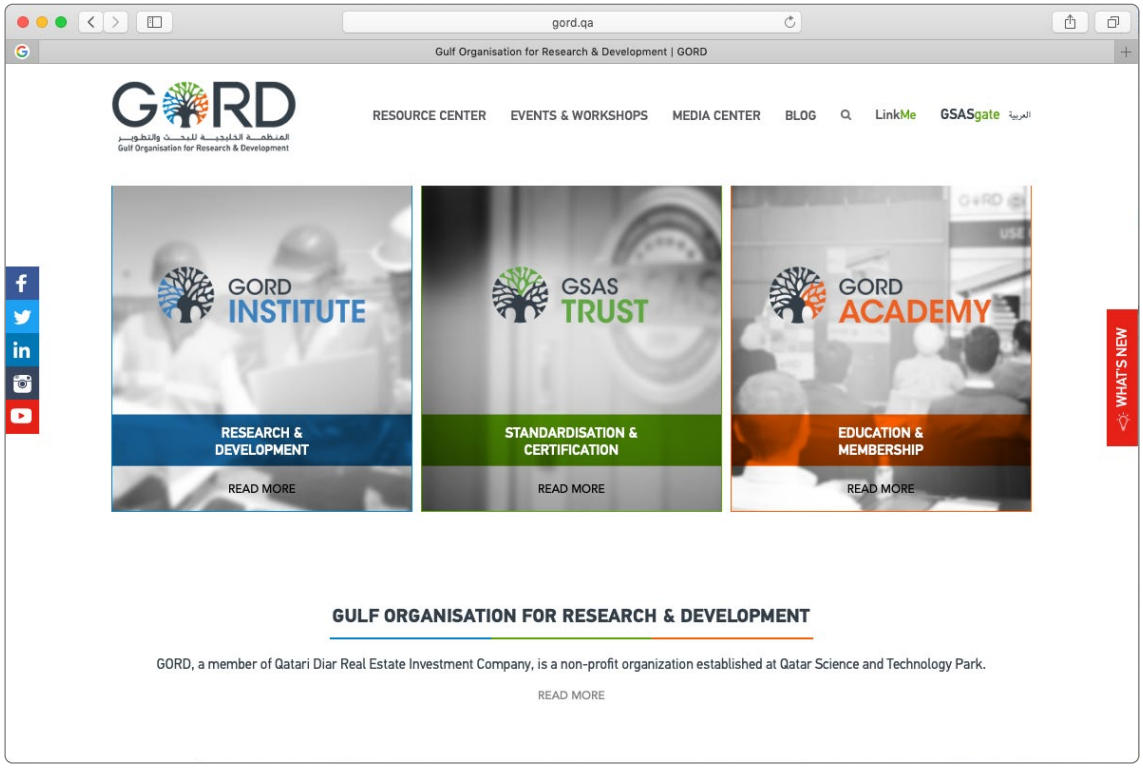


Figure 12: GORD Website

1.15 GSAS RESOURCE CENTER

The Resource Center is a web page on GORD website at http://www.gord.qa/gsas-trust/resource-center that contains useful GSAS resource materials and information, which are accessible to the general public (refer Figure 13).

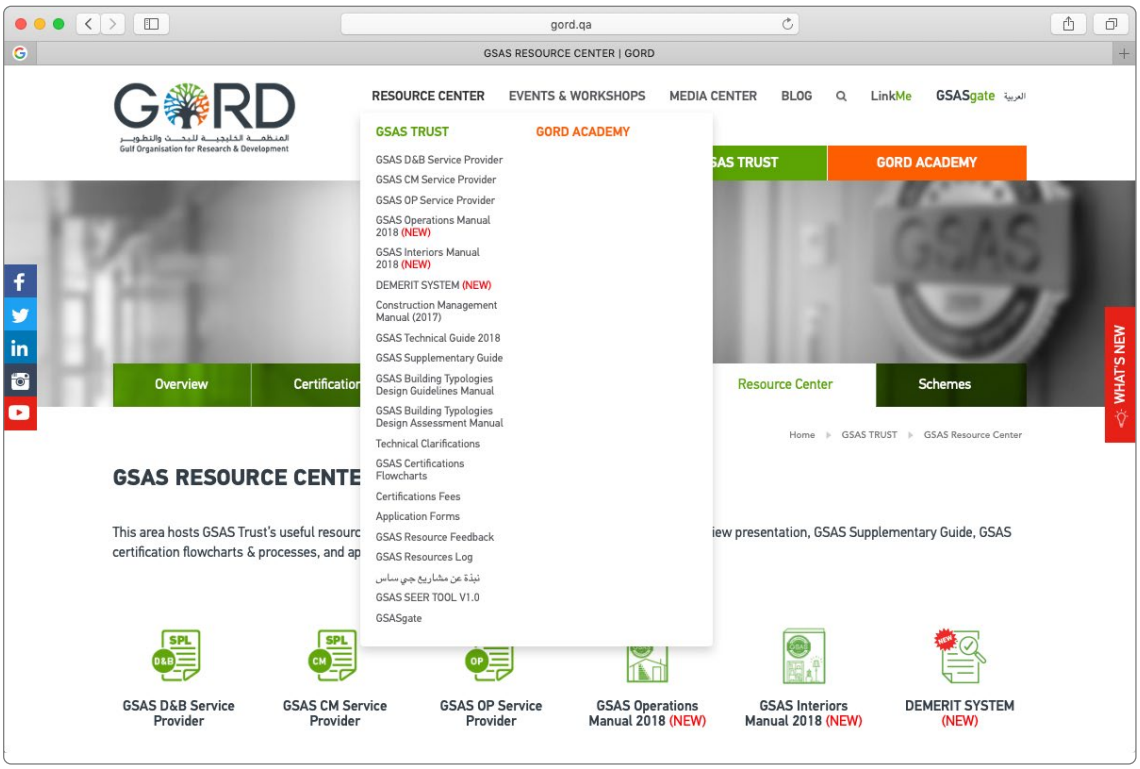


Figure 13: GSAS Resource Center

1.16 LINKME™

LinkMe™ is an online portal for community networking offered to GORD exclusive members. *LinkMe*™ provides members with the power to create a dynamic member profile, collaborate on projects, participate in events, share ideas, access resources and expertise - and, most importantly, connect with other members. Members can join groups, chapters and blogs (refer Figure 14).

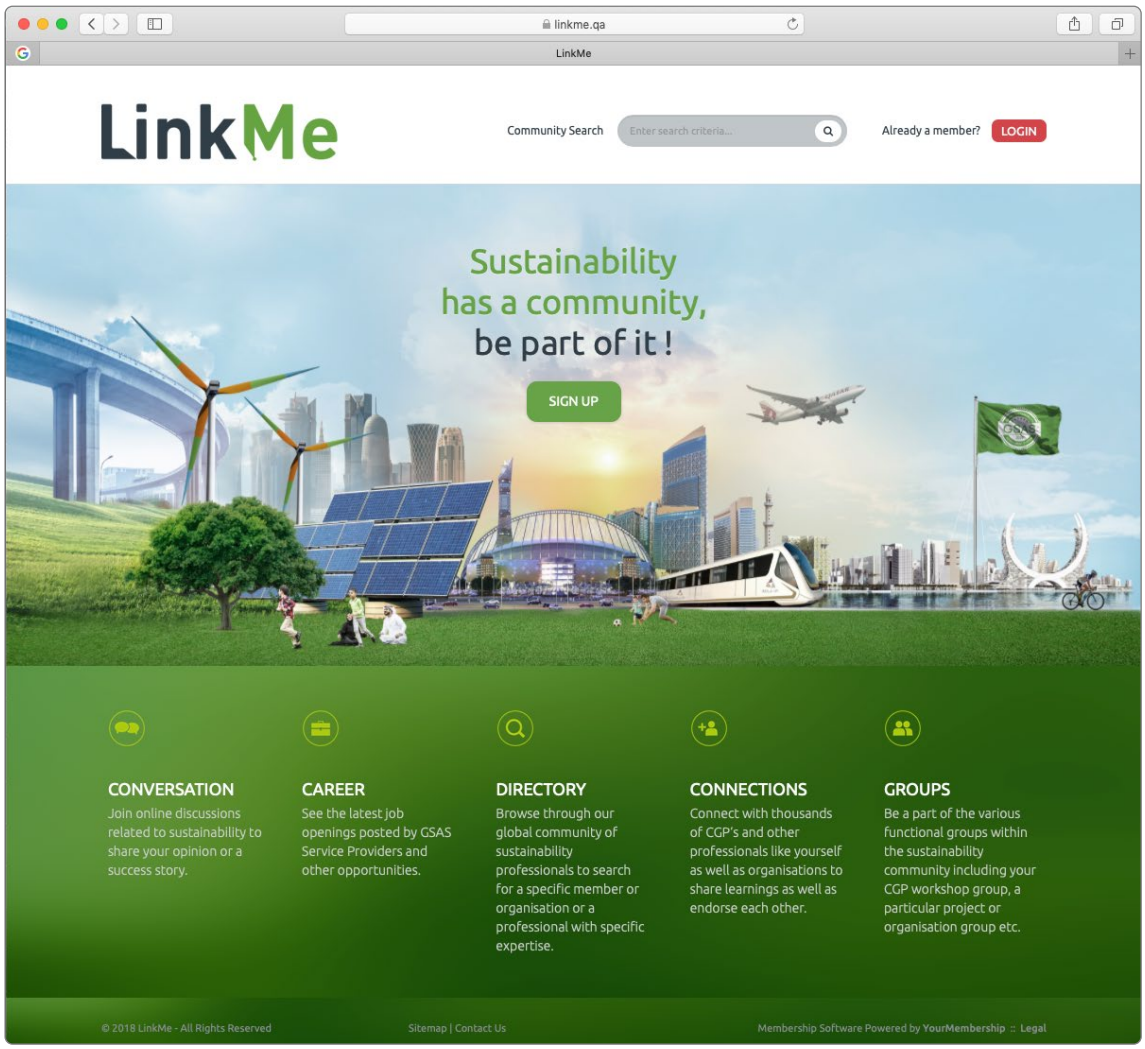


Figure 14: GSAS LinkMe™

SECTION (II)

GSAS CERTIFICATIONS

SYNOPSIS

There are three types of certification programs that GSAS offers to the construction industry to assess the sustainability performance of the development throughout the entirety of the project stages (i.e., Design, Construction and Operations stages). The types of certification programs are as follows:

- GSAS Design & Build Certification (GSAS-D&B)
- GSAS Construction Management Certification (GSAS-CM)
- GSAS Operations Certification (GSAS-OP)

GSAS Trust is the certifying body that issues GSAS certificate to the development in recognition of the project conformance to the requirements of the targeted GSAS certification schemes. GSAS Trust administers the assessment of the project and certifications of the development (refer Figure 15).

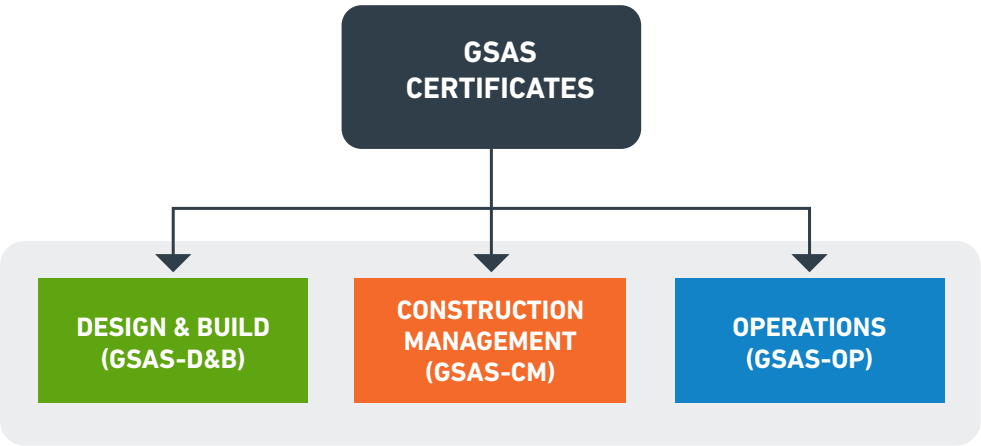


Figure 15: Types of GSAS Certification

This guide should be read in conjunction with all other relevant GSAS manuals and bulletins. Contact GORD for more details to know more about the extended support services appropriate to the needs of the project team (refer Section III).

CHAPTER 2 OVERVIEW OF GSAS CERTIFICATION TYPES

2.1 INTRODUCTION

GSAS certification types in relation to the project stages are shown in Figure 16. The categories & criteria, rating mechanisms, and certificates issued for each certification type are described in the proceeding sections.

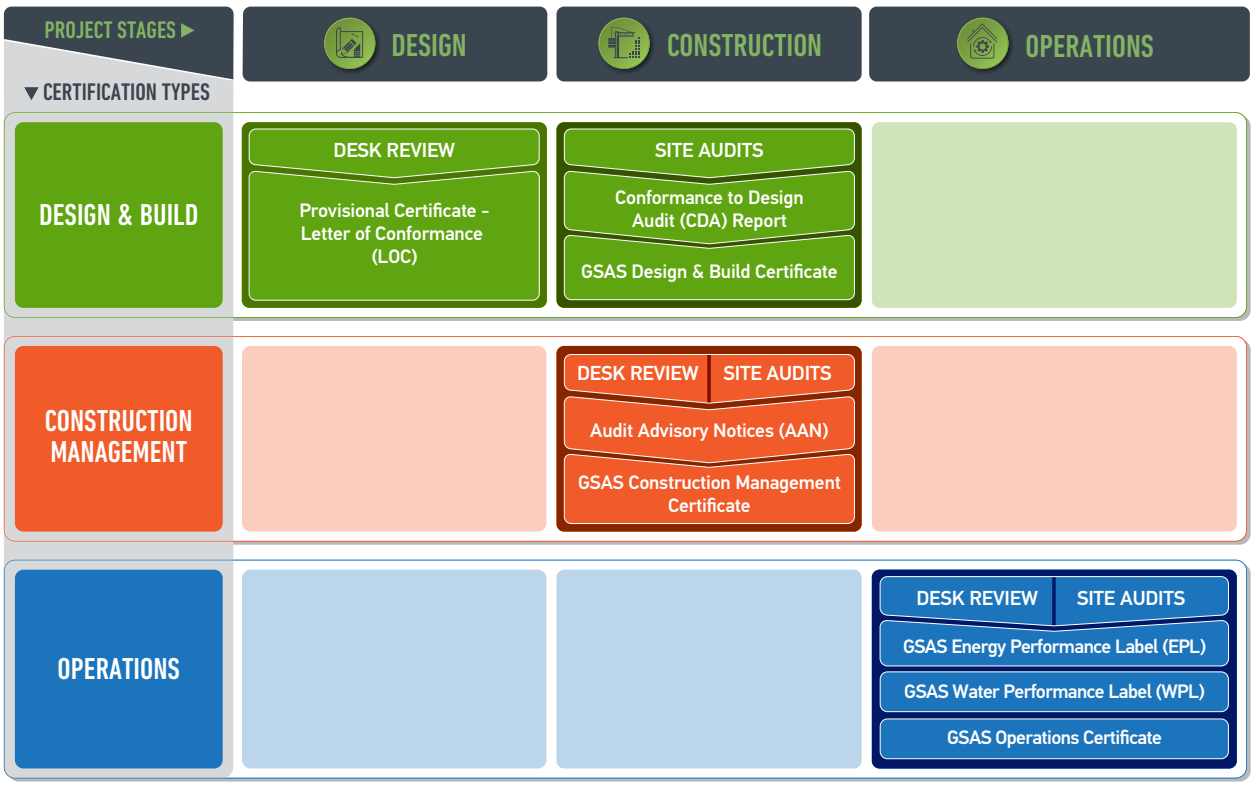


Figure 16: GSAS Certification and Project Stages

2.2 GSAS DESIGN & BUILD (GSAS-D&B)

The categories and criteria, rating mechanism, and certificate in GSAS-D&B certification program are described in the following sections.

2.2.1 GSAS-D&B Categories

2.2.1.1 The criteria of GSAS-D&B are divided into eight categories, each category measures a different aspect of the project's environmental impact. These categories are then sub-divided into specific criteria that measure and define individual issues (refer Figure 17).

Figure 17: GSAS-D&B Categories

2.2.1.2 The descriptions of GSAS D&B categories are as follows:

1. **Urban Connectivity [UC]:** The Urban Connectivity category consists of factors associated with the urban environment such as zoning, transportation networks and loadings. Loadings on the urban environment include traffic congestion and pollution.

2. **Site [S]:** The Site category consists of factors associated with land use such as land conservation or remediation and site selection, planning and development.

3. **Energy [E]:** The Energy category consists of factors associated with the energy demand of buildings, the efficiency of energy delivery and the use of fossil energy sources that result in harmful emissions.

4. **Water [W]:** The Water category consists of factors associated with water consumption and its impact on municipal supply and treatment systems.

5. **Materials [M]:** The Materials category consists of factors associated with material processing, manufacturing, distribution, use/reuse and disposal.

6. **Indoor Environment [IE]:** The Indoor Environment category consists of factors associated with indoor environmental quality such as thermal comfort, air quality, acoustic quality and light quality.

7. **Cultural & Economic Value [CE]:** The Cultural and Economic Value category consists of factors associated with cultural conservation and support of the national economy.

8. **Management & Operations [MO]:** The Management and Operations category consists of factors associated with building design management and operations.

2.2.2 GSAS-D&B Certification Stages

2.2.2.1 The targeted criteria are assessed in two different stages; the Design Stage and the Construction Stage. The targeted criteria are assessed in each stage and the final certificate rating is based on the construction stage outputs.

2.2.3 GSAS-D&B Criterion Levels

2.2.3.1 The Criterion level is quantifiable on the scale of -1 to 3 (-1, 0, 1, 2, 3), which represents an underlying uniform ordinal scale from negative level (-1) to optimal level (3). Using a negative scale allows criteria with greater impact to be emphasized and to work on achieving the incremental levels in the ordinal scale. In GSAS, a level of -1 for the criterion represents an unacceptable level of performance.

2.2.3.2 There are some exceptions to the use of negative level (-1) in GSAS-D&B criteria. For example:

- No negative levels for the Urban Connectivity category for all schemes except for GSAS Districts scheme, where negative level is permitted.
- No negative scores for the Management & Operations category for all schemes.

2.2.3.3 A results table is provided for each criterion assessed in GSAS certifications. The results table lists down the range of compliance levels and the measurement range associated with each level (see a sample results table in Figure 18).

Levels	Percentage of the Total Area that is Over-Lit by more than 20% (X) Indicator
-1	Illuminance and uniformity levels failed to meet the IESNA standards.
0	X > 30%
1	20% < X ≤ 30%
2	10% < X ≤ 20%
3	X ≤ 10%

Figure 18: Sample GSAS Criterion Levels Table

2.2.4 GSAS-D&B Criterion Weights

2.2.4.1 Each category and criterion have an associated weight based on the relative environmental, social and economic impact. The weight indicates the relative importance of the criterion in percentage.

2.2.4.2 Overall weight of each category is determined by aggregation of the individual weights of criteria belonging to that category.

2.2.4.3 In this example, the level is determined by first calculating the metric value achieved by the project on the lighting performance using GSAS calculator. The achieved criterion level is multiplied by the criterion weight divided by 100 to obtain the score given for the criterion. This is an automated calculation undertaken by GSAS scoring sheet specific to the building typology (refer Figure 19).

No	Category / Criteria	LEVELS		WEIGHTS							
		Min	Max	Commercial	Education	Homes	Hospitality	Light Industry	Mosques	Offices	Residential
IE	**Indoor Environment**										
IE.1	Thermal Comfort	-1	3	1.99%	1.67%	N/A	1.72%	1.85%	1.88%	1.87%	1.89%
IE.2	Natural Ventilation	-1	3	1.55%	2.13%	4.58%	2.16%	2.02%	2.49%	1.43%	2.85%
IE.3	Mechanical Ventilation	-1	3	2.75%	2.13%	N/A	2.16%	2.02%	2.49%	2.63%	2.85%
IE.4	Lighting	-1	3	1.79%	1.67%	2.98%	1.72%	1.85%	1.88%	1.67%	1.64%
IE.5	Daylight	-1	3	2.25%	2.13%	3.92%	2.16%	2.02%	2.49%	2.13%	2.85%
IE.6	Glare	-1	3	1.20%	1.67%	N/A	1.20%	1.85%	1.22%	1.67%	N/A
IE.7	Views	-1	3	1.50%	1.67%	2.98%	1.51%	1.50%	N/A	1.67%	1.51%
IE.8	Acoustics	-1	3	1.79%	1.67%	2.76%	2.05%	1.85%	1.88%	1.67%	1.64%
IE.9	Low-VOC Materials	-1	3	2.00%	2.13%	3.78%	2.16%	2.02%	2.49%	2.13%	1.64%
IE.10	Airborne Contaminants	-1	3	2.18%	2.13%	N/A	2.16%	2.02%	2.18%	2.13%	2.13%

Figure 19: Sample Criteria Weights

2.2.4.4 Extra incentive weights are allocated for specific criteria to emphasize their importance and to encourage additional efforts to implement best practices on sustainability.

2.2.5 GSAS-D&B Criterion Scores

2.2.5.1 Each criterion has an associated weight and once a level is assigned to the criterion in the assessment system, the values are multiplied by the weight and the score is determined.

2.2.6 2.2.6 GSAS-D&B Certification Ratings

2.2.6.1 After completing the assessments for each criterion, all scores accumulated for each criterion are totaled to obtain the cumulative or aggregated score of the project. The cumulative score for the project is the basis for determining the certification rating of the project.

2.2.6.2 The project cumulative score always falls within the range of -1.00 to 3.00. This is an automatic calculation generated in GSASgate™ based on the level achieved in each criterion or can be easily generated by using GSAS scoring sheet.

2.2.6.3 A project that obtains a cumulative score more than 0 receives a GSAS certificate.

2.2.6.4 Design & Build certification has six levels of certification to measure the environmental impact of the project. Each level of certification corresponds to a star rating from a minimum of 1-star up to a maximum of 6-stars (refer Figure 20).

SCORE	RATING
X < 0	Certification Denied
0.00 ≤ X ≤ 0.50	★
0.50 < X ≤ 1.00	★★
1.00 < X ≤ 1.50	★★★
1.50 < X ≤ 2.00	★★★★
2.00 < X ≤ 2.50	★★★★★
2.50 < X ≤ 3.00	★★★★★★

Figure 20: GSAS-D&B Tabulated Certification Scores and Ratings

2.2.6.5 The cumulative score determines the star rating of the project. In the below example for Offices scheme, the cumulative score of 0.568 receives a 2-Star rating (refer Figure 21).

GLOBAL SUSTAINABILITY ASSESSMENT SYSTEM

GSAS DESIGN & BUILD 2019 (4th Edition)

SCORING SHEET FOR BUILDING TYPOLOGIES

Legend:

	Input
	Not Applicable

Project Information	
Date:	
Project ID:	
Project Name:	
Project Location:	
Gross Area (m^2):	
Scheme:	Offices

Category	SC 1 - Overall Score 3.000	SC 2 - Overall Score 0.568
Urban Connectivity	0.180	0.060
Site	0.510	0.078
Energy	0.720	0.000
Water	0.480	0.060
Materials	0.270	0.093
Indoor Environment	0.570	0.195
Cultural & Economic Value	0.120	0.040
Management & Operations	0.150	0.042
Rating Achieved	**6 Stars**	**2 Stars**

Figure 21: GSAS-D&B Project Star Rating Sample

2.2.7 GSAS-D&B Certification Requirements

2.2.7.1 The following categories are mandatory for all ratings to obtain GSAS-D&B certification

- [E] Energy category
- [W] Water category

2.2.7.2 GSAS related criteria mentioned in Qatar Construction Specifications "QCS" are mandatory.

2.2.7.3 Certification is denied, and the project does not receive certification if:

- The project obtains a cumulative score below zero.
- The project receives a level of -1 in the Energy category.
- The project receives a level of -1 in the Water category

2.2.7.4 All projects targeting 5 Stars or 6 Stars rating should:

- Demonstrate that at least 5.0% of the total annual anticipated energy need of the project is supplied using onsite renewable energy
- Receive GSAS-CM certificate with a minimum rating of Class "B".

2.2.8 GSAS-D&B Certificate and Plaque of Recognition

Upon the successful completion of the project, it receives GSAS Design & Build Certificate and upon request, a Plaque of Recognition indicating the achieved GSAS Star rating for conforming to GSAS assessments and successfully completing the requirements of GSAS Design & Build certification. (See sample certificate and plaque in Figures 22 and 23).

Figure 22: GSAS-D&B Certificate

Figure 23: GSAS-D&B Plaque of Recognition

2.3 GSAS CONSTRUCTION MANAGEMENT (GSAS-CM)

The categories and criteria, rating mechanism, and certificate in GSAS-CM certification program is described in the following sections.

2.3.1 GSAS-CM Categories

2.3.1.1 The criteria of GSAS-CM are divided into eight categories, each category measures the construction practices and outlines the ways in which contractors can mitigate the negative sustainability effects. These categories are then sub-divided into specific criteria that measure and define individual issues (refer Figure 24).

Figure 24: GSAS-CM Categories

2.3.1.2 The descriptions of GSAS-CM categories are as follows:

1. **Urban Considerations [UC]:** The Urban Considerations category considers aspects related to traffic management, drain and stormwater contamination and waterbody contamination.

2. **Site [S]:** The Site category considers aspects related to preservation of land and biodiversity, and control of erosion, sediment, earthworks and dewatering.

3. **Energy [E]:** The Energy category considers aspects related to management of energy use during the construction process, both in temporary buildings on-site and plant and equipment utilized for the construction activities.

4. **Water [W]:** The Water category considers aspects related to water management for domestic and non-domestic applications.

5. **Materials [M]:** The Materials category considers aspects related to the diversion of existing waste from landfill or incineration, eco-labeling of temporary construction and building materials and cut and fill optimization.

6. **Outdoor Environment [OE]:** The Outdoor Environment category considers aspects related to control of dust, noise, vibration control, light pollution, odor, VOCs emissions, and the visual impact of the construction site.

7. **Socio-Cultural Dimension [SD]:** The Socio-Cultural Dimensions category considers aspects related to cultural conservation, protection of archeological remains and heritage sites, and interaction with the local community and stakeholders of the project.

8. **Management & Operations [MO]:** The Management and Operations category considers aspects related to waste management, welfare facilities, construction health & safety and workers accommodation.

2.3.2 GSAS-CM Certification Stages

2.3.2.1 The targeted criteria are assessed in three different construction stages; the Enabling/ Foundation Stage, the Substructure & Superstructure Stage and the Finishing Stage. The targeted criteria are assessed in each stage and an overall score for the stage is assigned.

2.3.3 GSAS-CM Criterion Levels

2.3.3.1 The determination of the criterion level depends on the assessment approach which can take one of the following forms:

1. Performance-based assessment: where the criterion is assessed based on quantitative performance indicators associated with the implementation of sustainable methods and measures. The criterion level is determined by a calculator based on such indicators.

2. Prescriptive-based assessment: where the criterion is assessed based on qualitative performance indicators associated with the implementation of sustainable methods and measures. A report must be submitted by the project to demonstrate implementation of the methods and measures included in GSAS-CM Guidelines Manual. Compliance is achieved if the methods and measures have at least 80% degree of compliance, taking into consideration the justified hierarchy of the methods and measures, and the degree of implementation (none, low, moderate, high or not applicable) based on the significance of the sustainability impacts of the specific project under assessment. The criterion level is determined based on compliance to such indicators.

3. Mixed assessment: where the assessment is based on quantitative performance indicators and qualitative evaluation. In such instances the criterion level is determined based on the overall achievement of the two assessment methods.

4. Inherited-weight assessment: where the levels of some criteria under GSAS-CM Site category can be inherited from GSAS Design & Build (GSAS-D&B) corresponding criteria as indicated in the awarded Letter of Conformance (LOC). This is subject to confirmation that the construction project meets the requirements for the inherited level.

2.3.3.2 The criterion level is quantifiable on a scale of 0 to 3, where level 0 refers to "evidence not acceptable" or "requirements not attained" and levels 1 to 3 correspond to increasing improvements in the sustainability of the construction processes and practices.

2.3.4 GSAS-CM Criterion Weights

2.3.4.1 Each category and criterion have an associated weight based on the relative environmental, social and economic impact. The weight indicates the relative importance of the criterion in percentage. Overall weight of each category is determined by aggregation of the individual weights of criteria belonging to that category.

2.3.4.2 Incentive weights are allocated for certain GSAS-CM criteria to encourage additional efforts to implement best practices on sustainability.

2.3.5 GSAS-CM Criterion Scores

2.3.5.1 Each criterion has an associated weight and once a level is assigned to the criterion, the value is multiplied by the weight and the score is determined.

2.3.6 GSAS-CM Certification Ratings

2.3.6.1 For each construction stage, an overall score is calculated as the sum of all criteria achieved scores. As the overall score for the three stages are assigned, the overall project score is calculated.

2.3.6.2 Five performance-based criteria, namely [E.1] Energy Use – Temporary Buildings, [W.1] Domestic Water Use, [M.1] Materials Diversion from Landfill, [M.3] Cut & Fill Optimization and [MO.1] Waste Management; are assessed on a cumulative basis. The calculators inputs are based on the measurements from the commencement of the construction works. Therefore, for each of the five criteria, the achieved criterion levels in stages 1 and 2 will have a temporary status, and will not be considered when calculating the project overall score. The criterion level determined by the calculator in Stage 3 will automatically be considered in calculating the final overall score of the project. Apart from the above five criteria, the overall project score is considering the average scores of the three construction stages.

2.3.6.3 The project cumulative score always falls within the range of 0.00 to 3.00. This is an automatic calculation generated in GSASgate™ based on the level achieved in each criterion or can be easily generated by using GSAS scoring sheet.

2.3.6.4 The certification rating is awarded based on the overall score of the project. Construction Management certification has five ratings based on "Class" designation to reflect the construction practices impact (refer to Figure 1). The minimum acceptable rating for a construction project is Class D, with a minimum project overall score of 0.5. The highest rating a project can achieve is Class A★ corresponding to a minimum project overall score of 2.5 (refer to Figure 25).

SCORE	RATING
$X < 0.5$	CERTIFICATION DENIED
$0.5 \leq X < 1.0$	CLASS D
$1.0 \leq X < 1.5$	CLASS C
$1.5 \leq X < 2.0$	CLASS B
$2.0 \leq X < 2.5$	CLASS A
$X \geq 2.5$	CLASS A★

Figure 25: GSAS-CM Tabulated Certification Scores and Ratings

2.3.7 2.3.7 GSAS-CM Certification Requirements

2.3.7.1 As a pre-requisite, GSAS-CM requires development and submission of GSAS Construction Management Plan (GSAS-CMP) highlighting the targeted categories, criteria, rating, the management resources and processes required to meet the targets. The submission of the GSAS-CMP is a prerequisite for obtaining the certification.

2.3.7.2 The following criteria are mandatory for all Classes to obtain GSAS-CM certification and a minimum level of 1 must be achieved in all three construction stages under each of these criteria:

- [UC.1] Traffic Management.
- [OE.1] Dust Control.
- [OE.2] Noise & Vibration Control.
- [MO.1] Waste Management.
- [MO.3] Construction Health & Safety

2.3.7.3 Energy and Water categories are mandatory for projects targeting a "Class B" rating or higher. The minimum level to be achieved under each of these categories is 1, as described below:

- [E.1] and [W.1] are performance-based criteria, in which parameters are measured on a cumulative basis from the commencement of the construction works; therefore, achieving at least level 1 in stage 3 is mandatory.
- [E.2] and [W.2] are prescriptive criteria and a minimum level of 1 must be achieved in all three construction stages.
- If the Project fails to achieve above minimum levels, the certification rating would be downgraded to class C or D as applicable.

2.3.7.4 Certification is denied, and the project does not receive certification if:

- The project GSAS-CMP is not submitted or does not demonstrate compliance with the requirements.
- The project obtains a cumulative score below 0.5. In the below example, the project's cumulative score of 0.205 doesn't receive a certificate (refer Figure 26).
- The project achieved a level of 0 in Energy category for projects targeting ratings of Class B and above.
- The project receives a level of 0 in Water category for projects targeting ratings of Class B and above.

GLOBAL SUSTAINABILITY ASSESSMENT SYSTEM

GSAS CONSTRUCTION MANAGEMENT 2019

SCORING SHEET

Legend:

	Input
	Not Applicable

Project Information	
Date:	
Project ID:	
Project Name:	
Project Location:	
Construction Stage:	Stage 1
Plot Area (m^2):	

Category	Scenario 1 - Overall Score 3.000	Scenario 2 - Overall Score 0.205
Urban Considerations	0.210	0.025
Site	0.450	0.000
Energy	0.480	0.000
Water	0.420	0.000
Materials	0.390	0.000
Outdoor Environment	0.480	0.120
Socio-Cultural Dimension	0.150	0.000
Management & Operations	0.420	0.060
Rating Achieved	**Class A***	**Certification Denied**

Figure 26: GSAS-CM Project Class Rating Sample

2.3.8 GSAS-CM Certificate and Plaque of Recognition

Upon the successful completion of the project, it receives GSAS-CM Certificate and upon request, a Plaque of Recognition indicating the achieved GSAS rating for conforming to GSAS assessments and successfully completing the requirements of GSAS-CM certification (see sample certificate and plaque in Figures 27 and 28).

Figure 27: GSAS-CM Certificate

Figure 28: GSAS-CM Plaque of Recognition

2.4 GSAS OPERATIONS (GSAS-OP)

The categories and criteria, rating mechanism and labeling, and certificate in GSAS Operations for New and Existing Buildings are described in the following sections.

2.4.1 GSAS-OP Categories

2.4.1.1 The criteria of GSAS-OP are divided into six categories, each category measures the facility operations environmental impacts and outlines the ways in which facility operators can mitigate the negative sustainability effects. These categories are then sub-divided into specific criteria that measure and define individual issues (refer Figure 29).

Figure 29: GSAS-OP Categories

2.4.1.2 The descriptions of GSAS-OP categories are as follows:

1. **Energy [E]:** The Energy category considers aspects associated with energy consumption and delivery performance.

2. **Water [W]:** The Water category considers aspects associated with water consumption and the impact on municipal supply and treatment systems.

3. **Indoor Environment [IE]:** The Indoor Environment category considers aspects associated with indoor environmental quality assessment such as thermal comfort, air quality, lighting, daylight and views, and acoustic quality.

4. **Waste Management [WM]:** The Waste Management category considers aspects associated with the reduction, reuse and recycling of solid waste.

5. **Facility Management [FM]:** The Facility Management category considers aspects associated with practices and strategies implemented to ensure buildings are operated and maintained in a sustainable manner.

6. **Environmental Policy & Awareness [EPA]:** The Environmental Policy & Awareness category considers aspects associated with the educational campaign initiatives of the facility to promote and create awareness of the sustainability programs implemented for managing the assets and operations of the building.

2.4.2 GSAS-OP Criterion Levels

2.4.2.1 Assessment of the criteria in GSAS Operations is either quantitative and/or qualitative. In GSAS Operations, level 0 refers to "evidence not acceptable" or "requirements not attained", while levels from 1 to 3 refer to gradual improvements in the sustainable practices related to the operation and maintenance of the building.

2.4.3 GSAS-OP Criterion Weights

2.4.3.1 Each category and criterion have an associated weight based on the relative environmental, social and economic impact. Once a level is assigned to each criterion in the assessment system, the values are multiplied by the weight and a cumulative final score is determined. Certification can only be achieved when the final score is equal or greater than 0.5 (refer Figure 30).

2.4.3.2 Incentive weights are allocated for certain GSAS-OP criteria to encourage additional efforts to implement best practices on sustainability.

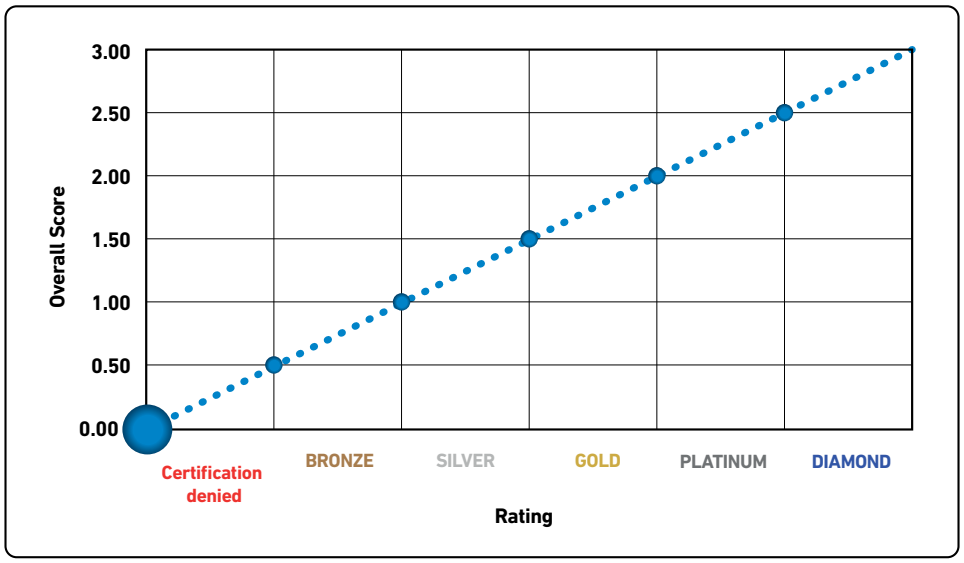


Figure 30: GSAS-OP Certification Rating

2.4.4 GSAS-OP Criterion Scores

2.4.4.1 Each criterion has an associated weight and once a level is assigned to the criterion in the assessment system, the values are multiplied by the weight and the score is determined.

2.4.5 GSAS-OP Ratings and Labels

2.4.5.1 After completing the assessments for each criterion, all scores accumulated for each criterion are totaled to obtain the cumulative or aggregated score of the project. The cumulative score for the project is the basis for determining the certification rating of the project.

2.4.5.2 The project cumulative score always falls within the range of 0.00 to 3.00. This is an automatic calculation generated in GSASgate™ based on the level achieved in each criterion or can be easily generated by using GSAS scoring sheet.

2.4.5.3 A project that obtains a cumulative score more than 0.5 receives a GSAS certificate.

2.4.5.4 Five certification ratings are introduced for GSAS Operations Schemes to recognize the project achievement of measuring the sustainability impact of operational practices for a specific building type. These are Bronze, Silver, Gold, Platinum, and Diamond ratings, with Bronze representing the lowest achievement and Diamond representing the highest. The maximum attainable rating for Standard Scheme is Gold, while Platinum Schemes can reach up to Diamond rating. Each rating corresponds to a specific range of the aggregated score of all criteria (refer Figure 31).

SCORE	RATING
X < 0.5	CERTIFICATION DENIED
0.5 ≤ X < 1.0	BRONZE
1.0 ≤ X < 1.5	SILVER
1.5 ≤ X < 2.0	GOLD
2.0 ≤ X < 2.5	PLATINUM
X ≥ 2.5	DIAMOND

Figure 31: GSAS-OP Tabulated Certification Scores and Ratings

2.4.5.5 Energy and Water categories levels are obtained based on the building performance compared to a standardized benchmark specified for each type of building. Benchmarks for GSAS Operations vary from those used in GSAS Design & Build certification as they are tailored to take into consideration the parameters related to the actual use of the building.

2.4.5.6 To demonstrate the performance of the project in Energy and Water, the levels are divided into bands ranging from A to G, where A represents the most efficient band. The visual representations of bands achieved in these categories are illustrated in Figures 32 and 33.

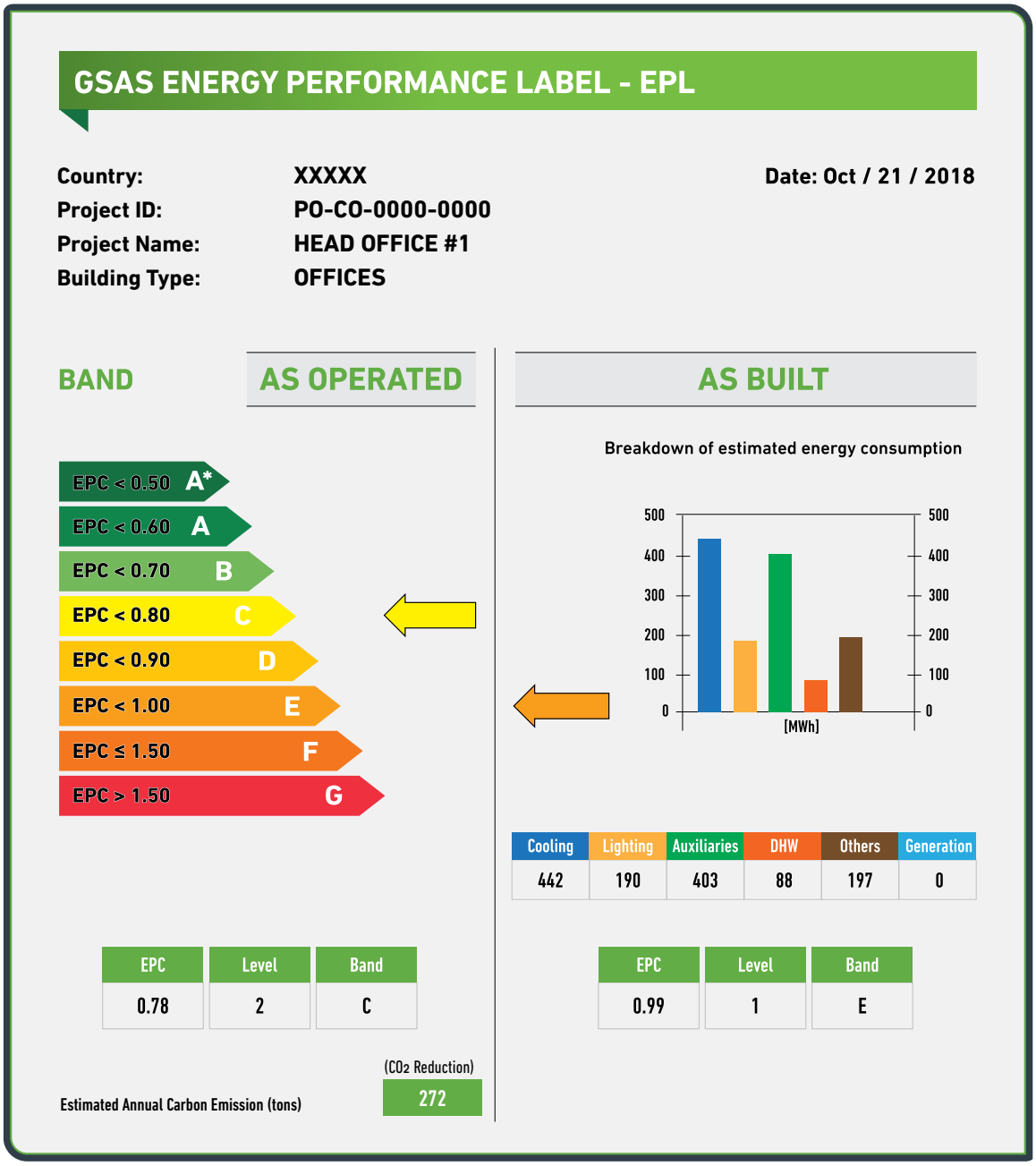


Figure 32: GSAS-OP Energy Performance Label (EPL)

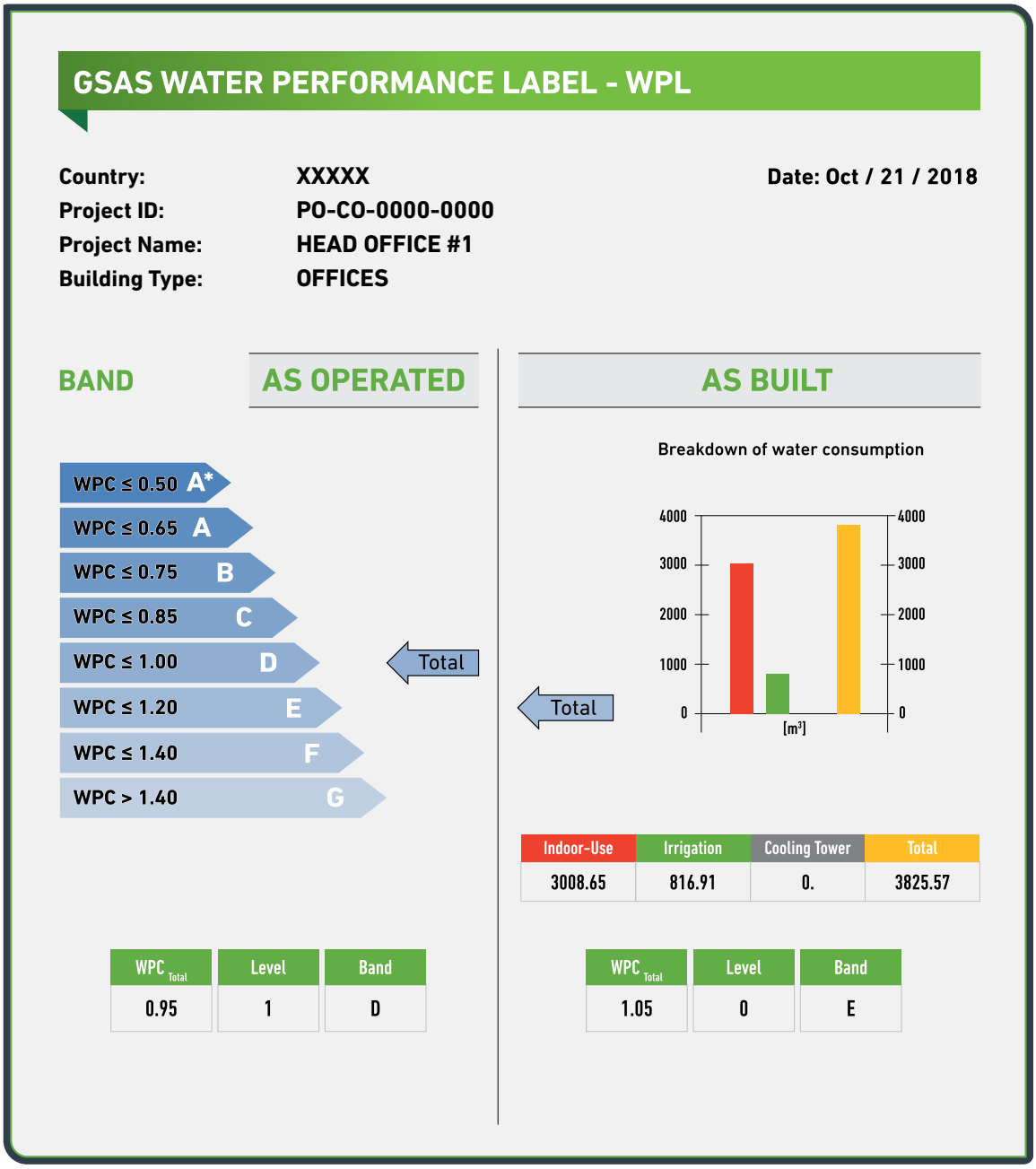


Figure 33: GSAS-OP Water Performance Label (WPL)

2.4.5.7 Projects seeking Energy Neutral Mark, only one rating namely "Certified" is granted when compliance with the minimum requirements is demonstrated.

2.4.5.8 Projects seeking Healthy Building Mark, only one rating namely "Certified" is granted when compliance with the minimum requirements is demonstrated.

2.4.6 GSAS-OP Certification Requirements

2.4.6.1 Targeting [E], [W], [WM], [FM] & [EPA] criteria is mandatory to obtain GSAS certification for Standard Scheme. Compliance in [E] Energy and [W] Water criteria with a minimum Level of 1 in each, is mandatory to obtain GSAS Platinum certification or above.

2.4.6.2 Targeting [E], [W], [IE], [WM], [FM] & [EPA] criteria is mandatory to obtain GSAS certification for Premium Scheme. Compliance in [E] Energy and [W] Water criteria with a minimum Level of 1 in each, is mandatory to obtain GSAS Platinum certification or above.

2.4.6.3 Targeting [E] criteria is mandatory to obtain Energy Neutral Mark. Compliance in [E] Energy, with a minimum Level of 3 in each, and compliance with 100% of annual energy requirements is also mandatory to obtain Energy Neutral Mark.

2.4.6.4 Targeting [IE], [WM] & [FM] criteria is mandatory to obtain Healthy Building Mark. Compliance in [WM] Waste Management and [FM] Facility Management criteria with a minimum Level of 1, and compliance in [IE] Indoor Environment criteria with a minimum Level of 1, and compliance in [IE.2] Air Quality criterion with a minimum Level of 2 is also mandatory to obtain Healthy Building Mark.

2.4.6.5 All projects targeting Diamond rating should demonstrate that at least 10% of the total electrical demand load of the facility is supplied using onsite renewable energy.

2.4.6.6 The [IE.2] Air Quality criterion under the Indoor Environment category covers the assessment of physicochemical pollutants of indoor air quality. It also covers the assessment of the active microbial agents of the indoor spaces.

2.4.6.7 The engagement of GSAS Accredited Service Providers in Energy, Waste Management, and Facility Management categories will enable the project to be eligible to earn extra incentive weights.

2.4.7 GSAS-OP Labels, Certificates and Plaques of Recognition

2.4.7.1 A project that successfully complies with the requirements of Standard or Premium Schemes will be awarded with the following:

- Certificate
- Energy and Water Performance Labels
- Plaque of Recognition

See sample certificate and plaque in Figures 34 and 35.

Figure 34: GSAS-OP Certificate

Figure 35: GSAS-OP Plaque of Recognition

2.4.7.2 A project that successfully complies with the requirements of Energy Neutral Mark will be awarded the Energy Neutral Mark. See sample plaque in Figure 36.

Figure 36: GSAS Energy Neutral Mark

2.4.7.3 A project that successfully complies with the requirements of Healthy Building Mark will be awarded the Healthy Building Mark. See sample plaque in Figure 37.

Figure 37: GSAS Healthy Building Mark

CHAPTER 3 GSAS DESIGN & BUILD CERTIFICATION

3.1 INTRODUCTION

GSAS-D&B certification is applied to new building and infrastructure projects where the building (and/or infrastructure) is developed following a design that demonstrates high sustainability performance of the building in line with a level stipulated under this certification. The certification requires measurements of relevant parameters and aspects in accordance with accepted practices, considering the impacts the building can mitigate. The sustainability issues covered under this certification are related to categories of Urban Connectivity, Site, Energy, Water, Materials, Indoor Environment, Cultural & Economic Value and Management & Operations. This certification ensures that the building design and development meets the targeted level of sustainability performance.

3.2 GSAS-D&B ASSESSMENT SCHEMES

A GSAS-D&B assessment scheme for D&B certification defines the built environment that is developed to meet a specific broad use or functionality e.g. Districts, Sports, Healthcare, Education and Offices. Each scheme may consist of different building types for different applications within the functional area. For example, kindergartens and colleges represent different building types within the 'Education' assessment scheme. Within a building type there may be spaces (or zones) which meet different purposes requiring specific design & build considerations. For example, a school building may have spaces or zones such as classrooms, administration, cafeterias, or outdoor play areas etc. Figure 38 represents the assessment schemes for GSAS-D&B certifications.

Figure 38: GSAS-D&B Assessment Schemes

The assessment applications of each scheme are described as follows. The schemes are supported by GSAS manuals for design "Assessment" and design "Guidelines". The schemes cover different types of projects from the macro level, i.e. Districts to the micro level i.e. different building types.

3.2.1 GSAS Districts Scheme

The scheme is used for assessing the planning and design of an urban development and/or its infrastructure.

1. Districts can be of a mixed-use type that caters to the varying needs of the population. Also, districts can be of a specific nature with a specific purpose e.g. an economic zone/city, an entertainment city, a media city and a health district etc. In addition, infrastructure components consist of interrelated systems and services such as roads, bridges, tunnels, water supply, sewers, electrical grids and telecommunications.

2. Districts typically consist of various building typologies and include several components such as infrastructure networks, transportation networks and public or open spaces. GSAS Districts can be applied to any combination of buildings and any size of development.

3. In assessing a district, the score of some of the applicable criteria to a master plan can be inherited by individual buildings in that district.

4. Both new and existing districts can be assessed under GSAS Districts. New districts will be evaluated according to the design intent of the master plan and a provisional certificate will be issued if the project achieves at least a 1 Star rating. After the construction of the district, the project will undergo design verification and a final certificate will be issued based on the results. Existing districts will be evaluated based on the actual built environment, including any changes made through revitalization efforts.

5. Districts are typically composed of several different building typologies, many of which are evaluated through GSAS rating systems. In order to evaluate the sustainability of the development as a whole, the assessment of certain criteria in GSAS Districts depends upon the scores of GSAS criteria. These GSAS Districts criteria include GSAS Rated Typologies [S.12], Water Consumption [W.1] and the four criteria under Energy [E.2 – E.5]. The project will identify target scores for new districts and achieved scores for existing districts for the building typologies that can be assessed under GSAS Design.

6. Certain one-off facilities or buildings may consume significant resources but are necessary for the efficient operation of the district. As these facilities help the project achieve the sustainability goals, they may be omitted from Energy [E.2 - E.5] and Water Consumption [W.1] assessments. These buildings include, but are not limited to, district cooling plants, solid waste recycling centers and wastewater treatment facilities.

7. All projects must complete the assessment process for each criterion that is applicable to their particular typology. Some exceptions may apply based on the unique conditions of the project, and such exceptions will be determined, on a case-by-case basis, by the Certification Authority based on requests or submittals from the project. Examples of these exceptions include, but are not limited to, the following:

    - For a criterion where the measurement does not apply, the project will automatically earn a baseline level of 0 without needing to complete the measurement process such as performing simulations or completing the calculator.
    - For a criterion where, by definition of the measurement and the criterion level, the project should logically earn a level 3 compliance, then the project is exempt from the measurement process.

8. In most cases, the project should complete the measurement process as defined by the criterion. Exemptions will not be given based on pre-existing or inevitable conditions. For example, if a project selects a site with high ecological value and inevitably must degrade the site in order for any development to take place, then the project will receive a lower level of compliance for degrading the site.

3.2.2 GSAS Neighborhood Scheme (Mixed-Use Development)

1. The scheme is used to assess a zone within a district comprising of a group of buildings. The neighborhood may serve as development for mixed-use or a specific-use.

2. There are two categories of Neighborhood:

    Category (I): Mixed-use neighborhood which may include various building types such as retail stores, residential, commercial, hotels, a railway station etc.

    Category (II): Specific-use neighborhood which includes a major function with supporting facilities. For example, a residential neighborhood consisting of residential units with supporting facilities of grocery store, community spa etc.

3. For assessing a neighborhood, GSAS categories of Urban Connectivity, Site, Materials, Cultural & Economic Value and Management & Operations for the main building will be based on the scheme relevant to the main use, i.e. offices, educational, or light industry and all other buildings will inherit the scores of the above mentioned GSAS categories achieved by the main building.

4. The assessment of the other GSAS categories namely Energy, Water, and the Indoor Environment will be conducted for each building within the neighborhood and an aggregated score for all buildings will be issued to the project.

3.2.3 GSAS Offices Scheme

1. The scheme is used for the assessment of buildings developed for business and/or merchandising purposes.

2. Types of office buildings include corporate offices, retail stores and general-purpose working areas.

3. Office buildings include spaces or zones to serve various functions such as offices, conference hall, foyers, retail spaces and ancillary areas.

3.2.4 GSAS Commercial Scheme

1. The scheme is used for the assessment of a core & shell building where the infill of the building is wholly or partly not designed.

2. These buildings also include a variety of spaces or zones including shops, lobbies, offices, food court and entertainment spaces.

3. Examples for commercial scheme includes shopping malls, retail shops, enclosed and strip malls.

3.2.5 GSAS Homes Scheme

1. The scheme is used for the assessment of residential homes, such as single-family villas or houses, attached or detached.

3.2.6 GSAS Residential Scheme

1. There residential scheme includes all other residential building types including multi-unit apartments, condominium buildings, or groups of residential buildings.

2. Residential buildings may include zones such as housing units, community spas, and shopping complexes.

3.2.7 GSAS Mosque Scheme

1. The scheme is used for the assessment of a mosque building. Mosques include the congregational worship areas and ancillary buildings such as the Imam house.

2. Mosques are categorized as either a daily prayer mosque or a Friday mosque. The latter, in general, accommodates more people with more facilities such as car parking, an open court and a dedicated female zone.

3.2.8 GSAS Hospitality Scheme

1. The scheme is used for the assessment of hospitality buildings. The types of hospitality buildings which can be assessed using this scheme are: hotels, resorts and hotel apartments.

2. This building type includes a variety of spaces or zones such as guest rooms, lobbies, banquet halls, offices, conference halls, dining areas and kitchens, fitness centers, retails spaces and ancillary areas.

3.2.9 GSAS Light Industry Scheme

1. The scheme is used for the assessment of light Industry buildings. The intent is to assess the building performance but not the production line or process hosted by such facilities.

2. The building types under this scheme include warehouses and workshops. Various spaces or zones are developed for operational, administrative and general purposes.

3.2.10 GSAS Education Scheme

1. The scheme is used for the assessment of education buildings. Typical building types include kindergartens, schools, colleges, universities and research institutes.

2. Various spaces or zones in these buildings include classrooms, libraries, auditoriums, cafeterias, kitchens, offices and other spaces that are part of academic buildings, such as research laboratories.

3.2.11 GSAS Parks Scheme

1. The scheme is used for the assessment of parks. Parks include any area of open space, either preserved in its natural state or highly developed with landscaping, hardscapes, and/or recreational and resting areas provided for the enjoyment of the public.

2. Parks are used to rate both new and existing parks of all types and sizes. Existing parks will be evaluated based on the actual built environment, including any changes made through revitalization efforts.

3. Parks are used to evaluate the park and the on-site amenities, such as landscaped areas, walkways and picnic spaces, in addition to any minor service facilities including restrooms, storage sheds or small information centers. Any major facility, such as a recreation center, stadium, restaurant or office, should be individually rated using the applicable typology within GSAS design assessment, for example GSAS Sports and GSAS Commercial.

4. Parks are of various types such as a mini-park, district park, large urban park, regional park and zoological park, which serve different purposes. There are three major park classifications, these are:

    - Small: Small parks include mini and neighborhood parks, which generally consist of smaller plots of land that serve a residential area. These parks mainly serve as places for recreation and social interaction and provide limited facilities and services.
    - Medium: Medium parks include community parks and smaller municipal parks. These parks generally serve multiple neighborhoods or smaller urban areas and provide larger amounts of open space for recreational activity or cultural events.
    - Large: Large parks include major urban and regional parks, which often provide many public facilities and services. These types of parks often feature large amounts of open space, as nature preserves or cultural heritage sites which may be located far from cities.

5. For each park classification, there are individual GSAS design assessments which require unique measurements. For example, smaller parks may be exempt from certain criteria due to size limitations. Please refer to GSAS Parks Assessment & Guidelines manuals for further details.

3.2.12 GSAS Sports Scheme

1. The scheme is used for the assessment of sport buildings or venues that are designed to host a sporting event that support activities for athletes/competitors, support staff and spectators, whether indoor or outdoor air-conditioned or non-air-conditioned spaces.

2. The building types include outdoor stadiums, indoor arenas and outdoor courses.

3. Individual components for each building type may require unique measurements for Energy, Water and the Indoor Environment. Refer to GSAS Sports Assessment & Guidelines manual for further details.

3.2.13 GSAS Railways Scheme

1. The scheme is used for the assessment of railway station buildings. Station types include underground, at-grade and elevated stations.

2. Main station buildings include spaces or zones that serve various functions of a railway station such as, but not necessarily limited to, platform/concourse, offices, station control rooms, ticketing, retail, food/beverage areas and ancillary areas.

3. The scheme is applicable to main station buildings only. For satellite stations and the railway infrastructure, a new rating system will be developed called GSAS Network. Please refer to the Railways Assessment & Guidelines manual for further details.

3.2.14 GSAS Healthcare Scheme

1. The scheme is used for the assessment of healthcare buildings. The building type includes specialist hospitals, general hospitals, out-patient hospitals, primary care health centers and especially bio-medical research laboratories.

2. There are typical spaces or zones meeting different purposes, such as patient wards, offices, outpatient departments, intensive care units, cafeterias and training halls.

3.2.15 GSAS Interior Scheme

1. The scheme is used for the assessment of the building finishing works (fit-outs).

2. “Fit-out” is a term used to describe the process of making interior spaces and servicing of the building to meet the specific needs of an incoming occupier.

3. GSAS Interiors scheme covers the fit-out and maintenance of all types of buildings.

4. The scheme assesses GSAS categories in [E] Energy, [W] Water, [M] Materials, [IE] Indoor Environment and [MO] Management & Operations.

5. The "fit-out" scope referred to in GSAS Interiors scheme goes beyond the "retrofitting" or "refurbishment" terminologies used in the construction industry as the first term refers to providing something with a component or feature not originally fitted, and the latter term refers to a process of improvement by cleaning, decorating, or re-equipping. However, the "fit-out" scope is limited in provision as it does not include the works usually considered as part of the "renovation" which refers to the process of improving or modernizing by more than 50% of an old, damaged or defective building.

6. GSAS Interiors excludes any buildings or portions of the building that are not in compliance with the building regulations. Where there are non-complying building works as rejected by the local authority, GSAS Trust reserves the right to revoke the awarded rating from the Applicant.

7. For the purpose of the scheme, the certification body, namely GSAS Trust shall conduct two Conformance to Design Audits (CDA) during construction and post commissioning. The purpose of the audits is to verify the validity of the information provided for the design against the construction and to ensure the sustainability performance objectives of the project are adequately met in accordance with the design assessment. The audits shall be coordinated in advance and facilitated by the project team.

3.2.16 GSAS Renovation Scheme

1. The scheme is used for the assessment of the sustainability impact of the renovations on an existing building of any type, where more than 50% of the building is renovated or retrofitted.

2. As an existing building has a pre-determined footprint, orientation and structure, the scheme has a smaller number of criteria and their associated benchmarks are more relaxed compared to new construction projects undergoing the various GSAS-D&B assessment schemes.

3. The scheme assesses GSAS categories in [S] Site, [E] Energy, [W] Water, [M] Materials, [IE] Indoor Environment and [MO] Management & Operations.

3.2.17 GSAS Bespoke Scheme

1. Although most of the building types are covered by the schemes described above, there is a possibility that a certain isolated type of building may not fit in the above schemes. This scheme intends to serve such buildings, where GSAS Trust helps to provide special assistance to align the existing guideline and assessment documents as well as calculators to the specificity of such buildings.

2. GSAS Bespoke scheme cover car parks, museums, and data centers. Consult GORD for the other coverages of GSAS Bespoke scheme.

3.2.18 GSAS Energy Center SEER

1. A unique tool, GSAS SEER Tool™ has been developed by GORD to calculate the Seasonal Energy Efficiency Ratio (SEER) and generate a compliance report which can be submitted to GSAS Trust to support GSAS Energy category assessment.

2. SEER is the ratio of the total amount of cooling energy provided, divided by the total energy input to the cooling plant within the year. The SEER calculations should be conducted in accordance with the local climate and operating conditions for the specific cooling load profile of the project.

3. The tool calculates the SEER for chilled water central plants based on the following:

    - Chillers' selection parameters and nominal capacities
    - Performance curves based on the manufacturers' data
    - Coefficients for the cooling capacity as a function of the temperature curve
    - Coefficients for the energy input ratio function of the temperature curve and
    - Coefficients for the energy input ratio function of the Part Load Ratio
    - Thermal store capacities and hourly operation profiles, if applicable
    - Total building cooling coil load (8760 hours)
    - Climate data

3.3 GSAS-D&B CERTIFICATION PROCESS

3.3.1 GSAS-D&B certification process has two key stages:

Key Stage 1: The first key stage of the certification process is obtaining the provisional GSAS-D&B certificate in the form of a Letter of Conformance (LOC) based on design inputs.

Key Stage 2: The second key stage is during the construction phase where the project is audited to ensure conformance to design requirements in order to qualify for the final GSAS-D&B certification.

3.3.2 GSAS-D&B certification process is shown in Figure 39. The certification guidelines and protocols in addition to roles and responsibilities of GSAS-CGP, GSAS Trust and the Contractor are listed in the proceeding sections.

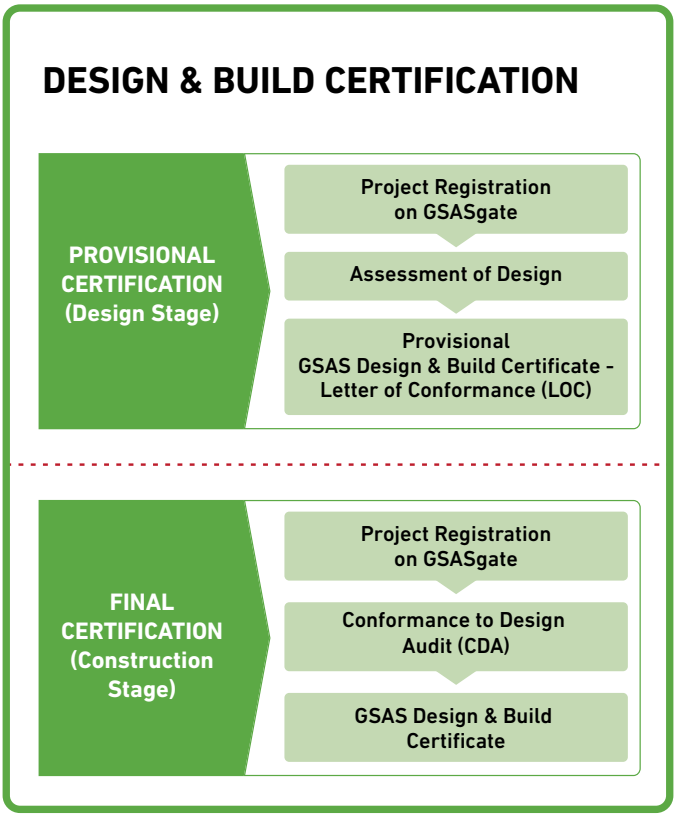


Figure 39: GSAS-D&B Certification Process

3.3.3 GSAS-D&B certification process involves 6 main steps, the first three steps are in the first key stage, and the remaining are in the second key stage:

Step 1: Registration of the Project at *GSASgate*™ for Provisional Certification

Step 2: Assessment of the Project Design

Step 3: Obtaining a Provisional GSAS-D&B Certificate – Letter of Conformance (LOC)

Step 4: Registration of the Project at *GSASgate*™ for Final Certification

Step 5: Conduct a Conformance to Design Audit (CDA)

Step 6: Receiving GSAS-D&B Certificate

3.3.4 Each of the steps are highlighted below. (refer Figures 40 and 41):

3.3.4.1 Step 1: Registration of the Project at *GSASgate*™ for Provisional GSAD-D&B Certification

1. The project registration at *GSASgate*™ is the starting point for all projects targeting GSAS Design & Build certificate. The Project owner/client is required to nominate a GSAS-D&B Service Provider (GSAS-D&B SP) with a valid GSAS corporate license.

2. The nominated Service Provider is required to appoint a GSAS-D&B Certified Green Professional (GSAS-D&B CGP) with a valid license who is responsible for managing the certification for the LOC stage. GSAS-D&B CGP will register the project at *GSASgate*™ and pay the associated fees for the gateway registration and project certification to activate the project account. Projects will choose either to follow the standard route of project certification as mentioned below, or the PCR route, and pay the associated fees.

3. PCR is an integrated delivery process for project certification. It is considered as an alternative route; optional for project teams to follow in order to receive additional technical support from GSAS Trust. The project technical team meets GSAS Trust's technical team through face-to-face meetings and/ or video conferencing to obtain clarifications to queries on project certification management and criteria assessments during the certification process. PCR is selected for each phase individually (design and/or construction). All applicable fees can be downloaded from the "Resource Center" on GORD website.

4. The project will then be activated on *GSASgate*™.

3.3.4.2 Step 2: Assessment of the Project Design

1. Upon activation of the project account, the project shall start using *GSASgate*™ to support the sustainability assessment of the project's design deliverables (refer Figure 40 & 41).

2. GSAS Trust will assess the project design deliverables from the design stage up to the construction stage. The project will adhere to GSAS Trust comments and exchanges of dialogues with the client in order to adequately attain each criterion score.

3. The project will have a specific number of submissions and review as indicated in *GSASgate*™ manual. The detailed process of *GSASgate*™ submission is illustrated in *GSASgate*™ manual, which can be downloaded from the "Resource Center" on GORD website.

4. As a part of the process, and prior to final acknowledgment of the criteria levels, the project team may initiate an appeal for the criterion. This will require revisiting the assessment after paying the associated fees of the appeal process. GSAS Trust will revalidate the submittals and award the final level with finality.

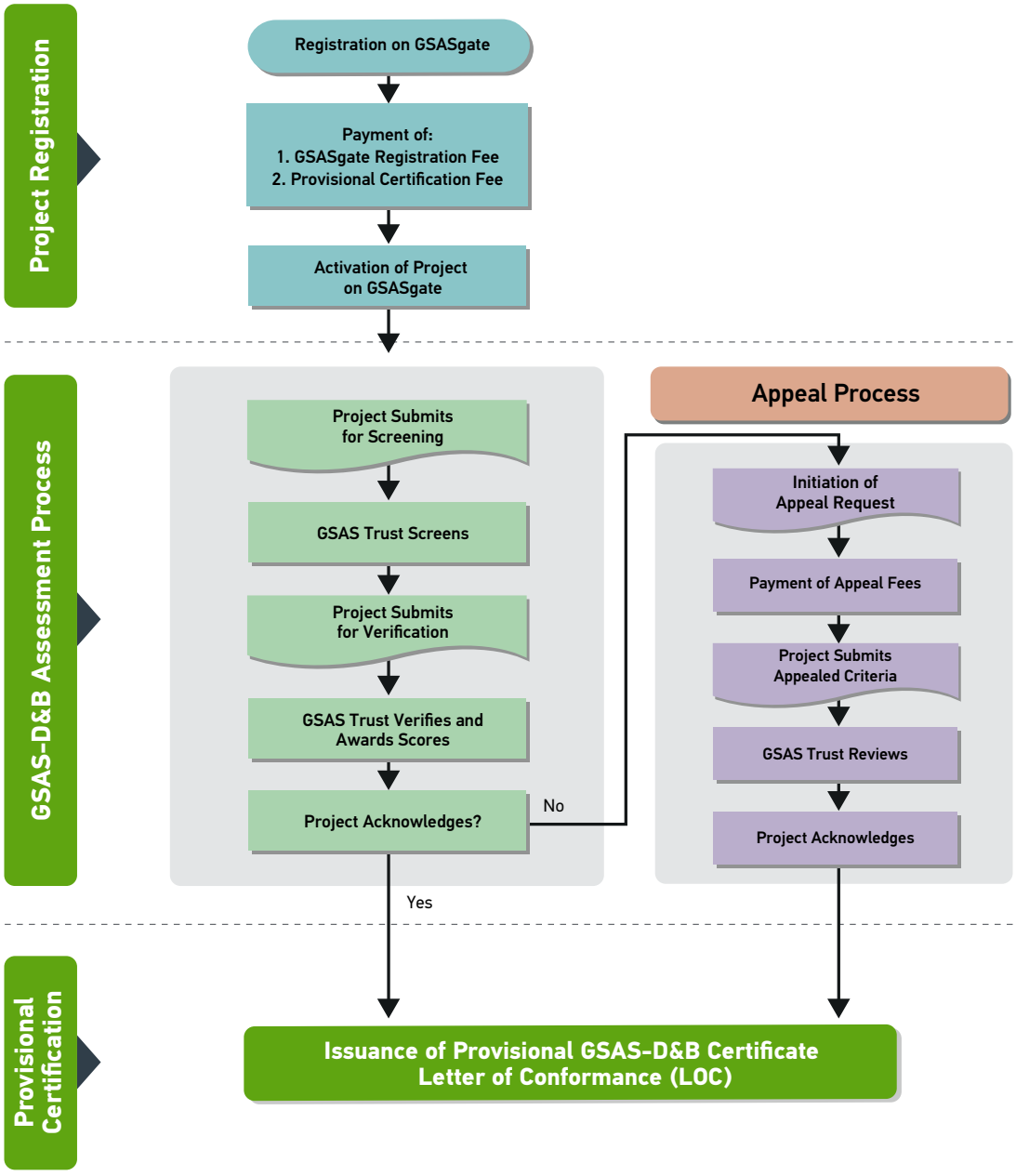


Figure 40: GSAS-D&B Certification Flowchart - Standard Route

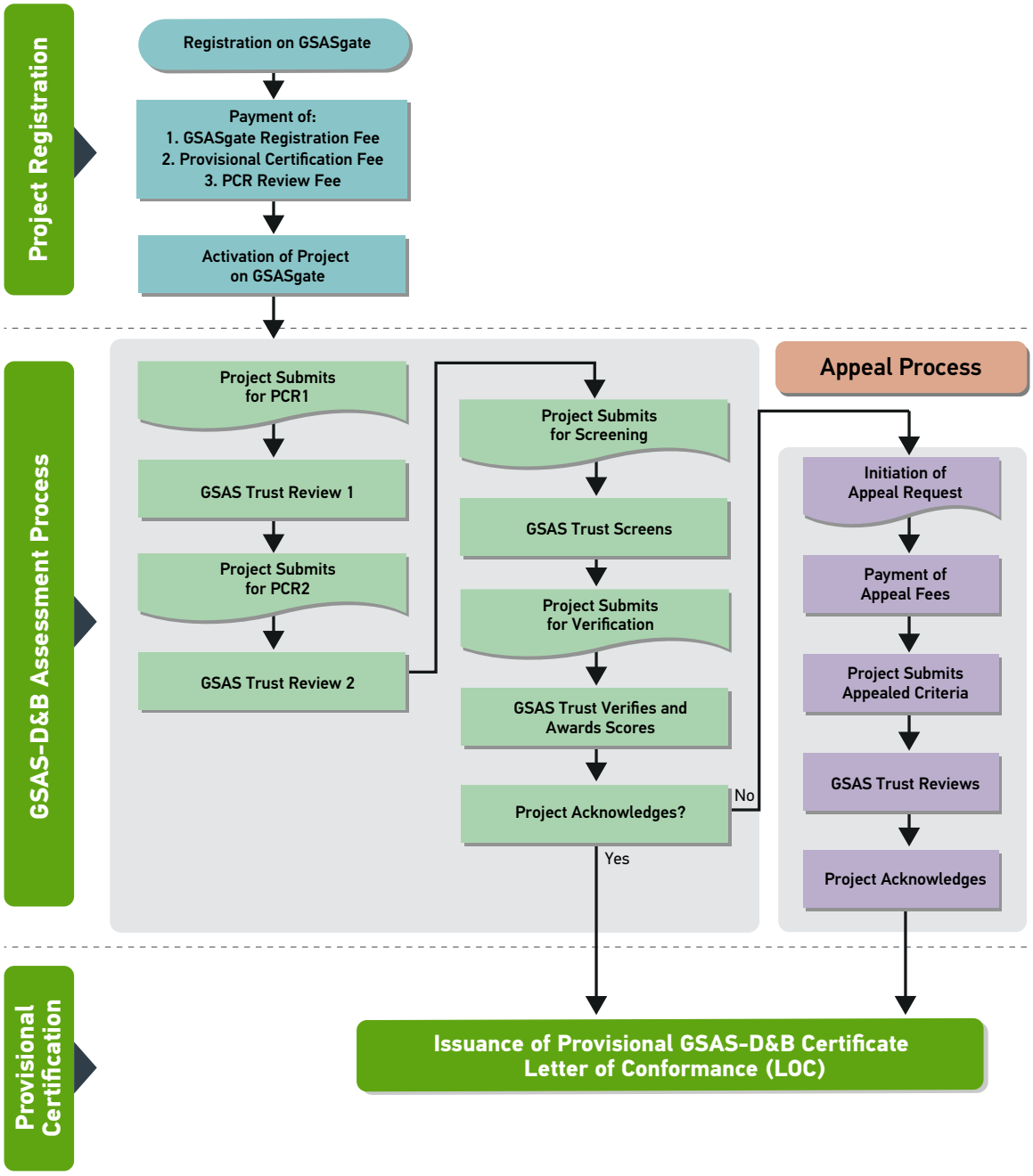


Figure 41: GSAS-D&B Certification Flowchart - PCR Route

3.3.4.3 Step 3: Obtaining a Provisional GSAS-D&B Certificate – Letter of Conformance (LOC)

1. At the end of the design stage and upon approval of the design submissions, the project will receive a Provisional GSAS Design & Build certificate in the form of a Letter of Conformance (LOC) indicating GSAS star rating. A sample LOC is shown in Figure 42.

GORD
المنظمة الخليجية للبحث والتطوير
Gulf Organisation for Research & Development

GSAS 2007

Issuance Date: xx, xxxx
Ref: LOC/QA 0505-0507

GSAS Design & Build Provisional Certificate
Letter of Conformance (LOC)

To	Company Name
Service Provider	Service Provide Name
GSAS Certificate	GSAS Design & Build (GSAS-D&B)
GSAS Version	GSAS 2019
Certification Stage	Letter of Conformance (LOC)
Project ID	PD-QA-xxxx-xxxx
Project Name	Project Name
GSAS Scheme	GSAS Neighborhood
Location	Qatar

This is to notify that GSAS Trust has assessed the project based on the submitted information. The project is found eligible to receive the Provisional GSAS-D&B Certificate in the form of "Letter of Conformance (LOC)"; achieving the following:

SCORE	STAR RATING
1.160	★★★

The summary of the obtained rating is attached herewith.

This letter is only the predecessor towards achieving the final GSAS-D&B Certificate and should not be considered as the final certificate. The project shall satisfy during the construction stage all the requirements of **Conformance to Design Audit (CDA)** which is a pre-requisite for the final GSAS-D&B Certificate as stipulated in GSAS Technical Guide, www.gord.qa

In the event of any future changes applied to the criteria pertaining to the issued LOC, the changes are required to be re-assessed once again.

Finally, Congratulations for partaking in this noble endeavor, and together let us build a healthy and a sustainable future.

Yours sincerely,

Dr. Yousef Alhorr
Founding Chairman

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واحة العلوم والتكنولوجيا في قطر | تك ١ | الطابق ٢
الوحدة ٢٠٣ | ص.ب. ٢١٠١٦٢ | الدوحة - قطر
ت: ٠١٠ ٤٤٠٤ ٩٧٤+ ف: ٠٢ ٤٤٠٤ ٩٧٤+

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Figure 42: GSAS-D&B Provisional Certification (LOC) Sample

2. The LOC will display the project certification type, scheme and provisional awarded star rating. It will also show the achieved level for each criterion.

3. The LOC cannot be used as a replacement or alteration of GSAS final certificate.

3.3.4.4 Step 4: Registration of Project at *GSASgate*™ for GSAS-D&B Certification

1. Upon receiving the LOC from GSAS Trust, the owner or client is required to nominate a representative, with a valid GSAS-D&B SP, to be responsible for managing the Design & Build certification process during the construction stage of the building.

2. The Project owner will submit to GSAS Trust an appointment letter confirming GSAS-D&B SP appointed representative for the LOC compliance audit works.

3. The nominated Service Provider is required to appoint a GSAS-D&B CGP with a valid license to register the project at *GSASgate*™ and pay the associated fees for the gateway registration and site audits. This is in addition to the fees for GSAS Certificate and plaque.

4. All applicable fees can be downloaded from the "Resource Center" on GORD website.

5. The project will then be activated on *GSASgate*™.

6. The project will submit approved as-built drawings as per GSAS requirements against each targeted criterion for GSAS Trust review. Refer to GSAS manuals for exact submissions.

3.3.4.5 Step 5: Conduct of Conformance to Design Audit (CDA)

1. During construction and later during commissioning, GSAS Trust auditors will conduct routine and random audits which must be facilitated by the appointed GSAS-CGP. The goal of these audits is to verify the validity of information provided during the design stages as well as to ensure that the sustainability performance objective of the project is met as per the initial design assessment (refer Figure 43).

2. Audit visits will be conducted by GSAS Trust or its 'Authorized Representative' on a 'routine' or 'random' basis. The 'routine' audit's time and scope are agreed beforehand, while in the 'random' audit, a short period of notice (48-72 hours) is given to the Client Representative.

Audits Plan:

The required number of routine and random audits for a project as outlined in Form - 08 shall be implemented during the following phases:

Phase (A)	Phase (B)	Phase (C)
Envelop Construction Works (Walls, Windows, Claddings, etc.)	Systems Installation	Commissioning Stage/Pre-occupancy

Audit Process

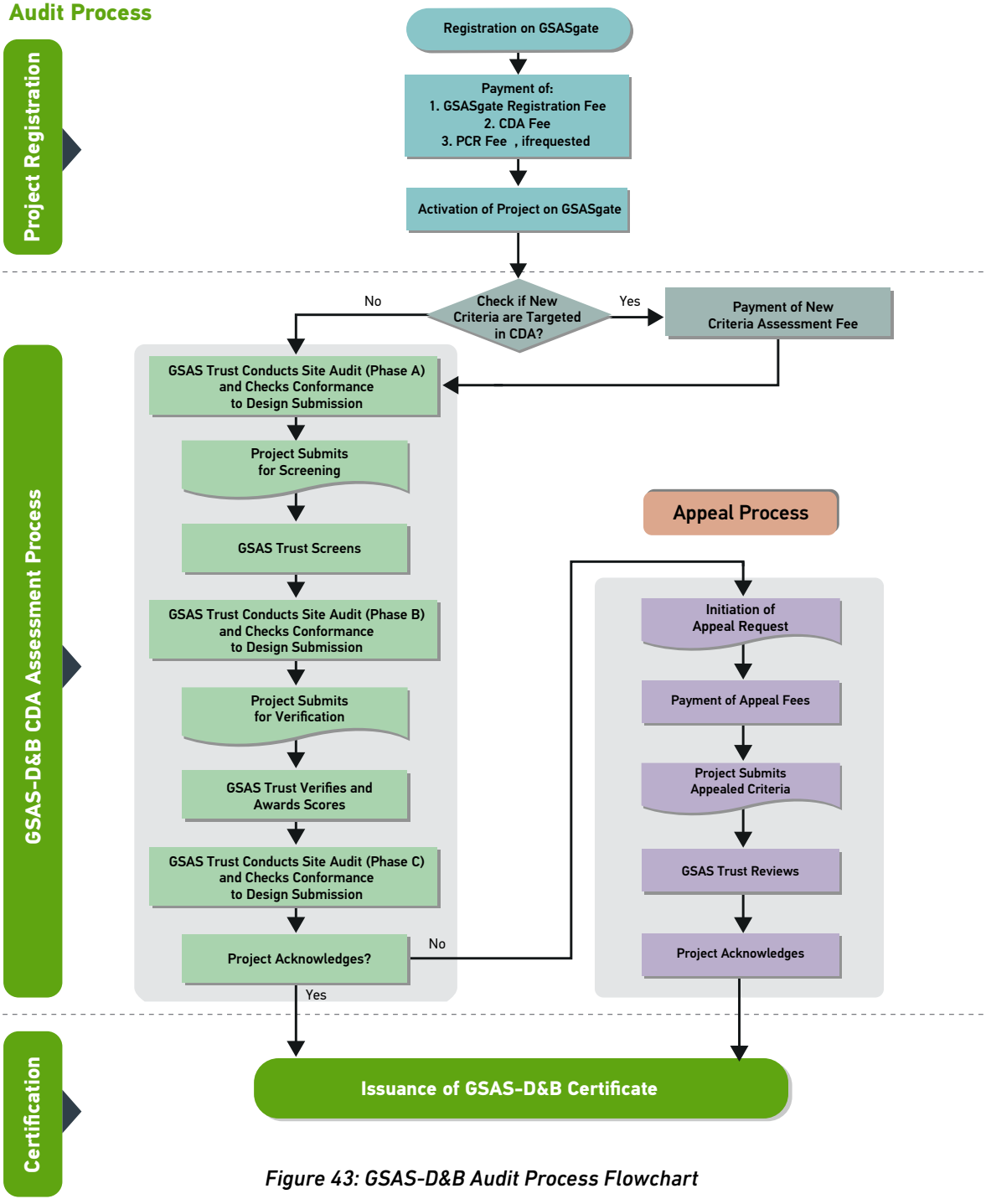

Figure 43: GSAS-D&B Audit Process Flowchart

3. Audit visits during the construction phase follow GSAS Trust audit protocols where the compliance requirements submitted during the design phase are validated. The project GSAS-CGP is required to complete the CDA checklist issued by GSAS Trust and return it to GSAS Trust prior to the site audit.

4. Audits are conducted on a random basis to collect the samples of evidence towards conformance to design, as part of GSAS Trust quality assurance process.

5. For the stipulated number of visits, please refer to GSAS Trust published schedule of visits available from GORD website.

6. For projects with multiple phases of construction, site visits are conducted depending on the project schedule and decided on a case-by-case basis.

7. During the CDA, the pursued criteria levels are verified against appropriate submittals and evidences. Consequently, the levels from the design stage can be maintained, upgraded or downgraded.

8. The assessed criteria in the LOC, if not pursued during construction, are assigned with the minimum level as indicated in the applicable scheme.

9. The project may opt for the failed (not accepted or non-conforming) criteria as indicated in the LOC to improve the levels during the construction stage. For such a case, the project is required to apply for the required number of criteria and pay the applicable assessment fees as per GSAS Trust published rates.

3.3.4.6 Step 6: Obtaining GSAS-D&B Certificate

1. Upon successful completion of the Conformance to Design Audit (CDA), and successful assessment of the final submission on *GSASgate*™, the Final GSAS Design & Build Certificate is issued to the project, for having conformed with the performance set forth in GSAS Design Assessment manual.

2. A Plaque of Recognition is issued upon the project request and posted after paying the applicable fees. The plaque indicates the final GSAS star rating achieved by the project.

3.4 ROLES AND RESPONSIBILITIES

3.4.1 GSAS-D&B CGP Roles & Responsibilities

3.4.1.1 A Project GSAS-D&B CGP may belong to a design consultancy firm, contractor, program/project management firm, construction management firm, construction supervision firm or an independent sustainability advisory firm that holds a valid GSAS Service Provider corporate license. See subsequent sections for applicable license types.

3.4.1.2 A contractor must hold a valid GSAS Design & Build Service Provider license. See subsequent sections for the applicable license types.

3.4.1.3 Roles and Responsibilities of GSAS-D&B CGP during the design stage of the project include but are not limited to:

1. Maintain and renew *GSASgate*™ registration, including paying all associated Registration fees and Appeal fees; if any.
2. Support the optimization of the design by utilizing a holistic integrated design process to attain all the project sustainability targets.
3. Assess the design deliverables to demonstrate the fulfillment of GSAS criteria.
4. Lead the overall planning, scheduling, and coordinating of the required project documentation.
5. Manage and prepare all submissions including calculators, drawings, specifications, calculations, simulations, studies, reports, toolkits and all other supporting documents necessary to substantially verify the claimed scores for each criterion and the assessed star rating of the project in GSAS rating systems.
6. Upload the submittals to *GSASgate*™ for GSAS Trust to review and comment.
7. Respond to GSAS Trust comments to ensure the project is designed to obtain GSAS Design & Build Certificate with the target rating.
8. Obtain the Provisional GSAS Design & Build Certificate in the form of a Letter of Conformance (LOC).
9. Appeal the achieved levels granted by GSAS Trust for each revoked criterion level, if any, and pay the associated fees.

3.4.1.4 Roles and Responsibilities of GSAS-D&B CGP during the construction stage of the project include, but are not limited to:

1. Register and pay all the associated fees for the Final Certification. These fees represent *GSASgate*™ Registration fees and LOC Conformance to Design Audits fees and GSAS Certificate & plaque production fees.
2. Lead the overall planning, scheduling and coordinating of the required project documentation.
3. Review and update GSAS submittals and report on a regular basis throughout the construction process.
4. Implement all plans to construct the project in accordance with the design documents submitted to achieve the Provisional GSAS Design & Build Certificate (Letter of Conformance); that states the preliminary status of certification and scores for each criterion granted by GSAS Trust for the project during the design stage.
5. Solicit, collect and maintain the required documentation from Sub-Contractors to fully document GSAS submittals in compliance with the obtained LOC, and sign-off all submittals and evidence relevant to the design parameters of the issued Provisional Certificate (LOC) for the project.
6. Sufficiently demonstrate that evidence, such as reports, photographs, bill of quantities, data sheets and other construction documents support the measurement principles of GSAS criteria before being submitted to GSAS Trust for the final review.
7. Support the LOC Conformance to Design Audits conducted on site by GSAS Trust for the fulfillment of the final GSAS Design & Build Certificate during and after completion of the construction work and respond appropriately to the non-compliance issues raised by GSAS Trust.
8. Ensure seamless audits by extending the required assistance and necessary support for the successful implementation of audits and collection of data.
9. Obtain the final GSAS Design & Build Certificate with the target star rating.

3.4.2 GSAS Trust Roles & Responsibilities

3.4.2.1 GSAS Trust is the certifying body that assesses and qualifies the project for the level of certificate granted to the applicant.

3.4.2.2 Roles and Responsibilities of GSAS Trust during the design stage of the project include:

1. Manage the certification process from the certification body side and ensure that the project is in line with all GSAS requirements.
2. Review the submitted data and evidence by GSAS-D&B CGP and verify the validity of information provided during the design stages.
3. Assess compliance with environmental approval and specific standards submitted to attain scores.
4. Advise the project CGP for the submittal requirements of the required criteria for the provisional certification.

3.4.2.3 Roles and Responsibilities of GSAS Trust during the construction stage of the project include:

1. Initiate the CDA site audit process in coordination with the project CGP.
2. Provide a briefing about GSAS CDA Site Audit procedures and documentation requirement.
3. Conduct a number of audit visits on a “Routine” and “Random” basis at various stages of the construction.
4. Review of the submitted data and evidences by GSAS-CGP and verify the validity of provided information.
5. Advise the project CGP for the final submittal requirements of the required criteria for the final assessment / final certification.

CHAPTER 4 GSAS CONSTRUCTION MANAGEMENT CERTIFICATION

4.1 INTRODUCTION

GSAS-CM certification program is applied to a project where the construction contractor follows the sustainable practices and processes. The certification requires measurements of relevant parameters and aspects in accordance with accepted practices, considering the impact that the construction project can mitigate. The sustainability issues covered under this certification are related to categories of Urban Considerations, Site, Energy, Water, Materials, Outdoor Environment, Socio-Cultural Dimensions and Management & Operations.

This certification program ensures that the contractor's practices and processes during the entire stage of the project construction phase meet the targeted level of sustainability performance. All types of project developments can be certified for their sustainability performance during construction using GSAS-CM Certification program.

4.2 GSAS-CM CERTIFICATION PROCESS

4.2.1 GSAS-CM certification process flowcharts are shown in Figures 43 and 44. The main contractor has the option to apply for GSAS-CM certification either through the standard route or the PCR route.

4.2.2 The project construction practices are assessed across three different periods to ensure compliance with sustainability best practices throughout the construction phase, namely; the Enabling/Foundation Stage, the Substructure & Superstructure Stage and the Finishing Stage.

4.2.3 The certification process for obtaining GSAS-CM certificate is listed in the forthcoming sections.

Step 1: Registration of the Project at *GSASgate*™

Step 2: Assessment of GSAS Construction Management Plan (GSAS-CMP)

Step 3: Assessment of the Project Construction Activities

Step 4: Conducting Site Audits

Sep 5: Obtaining Audit Advisory Notices (AAN's)

Step 6: Obtaining GSAS-CM Certificate

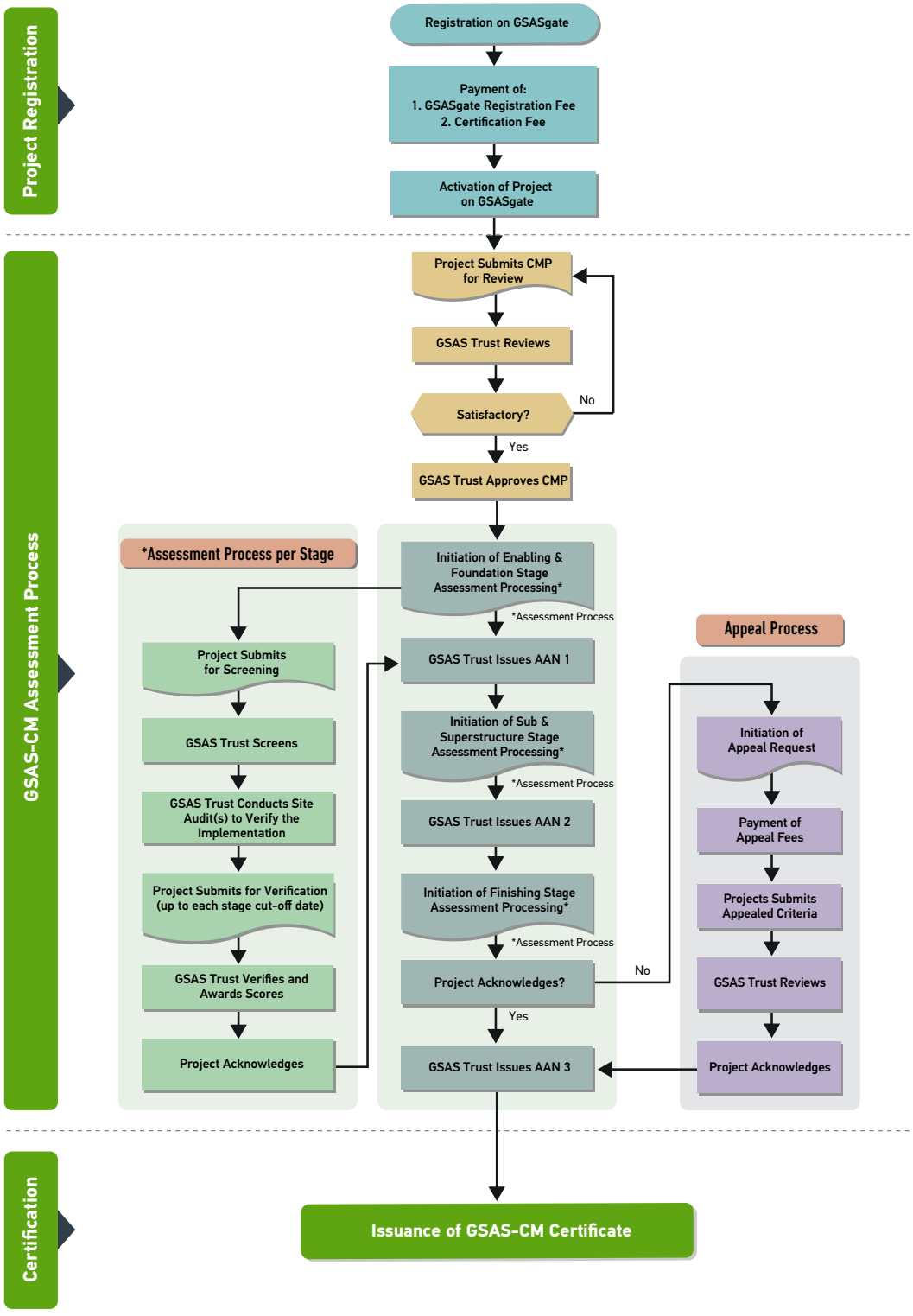

Figure 44: GSAS-CM Certification Flowchart – Standard Route

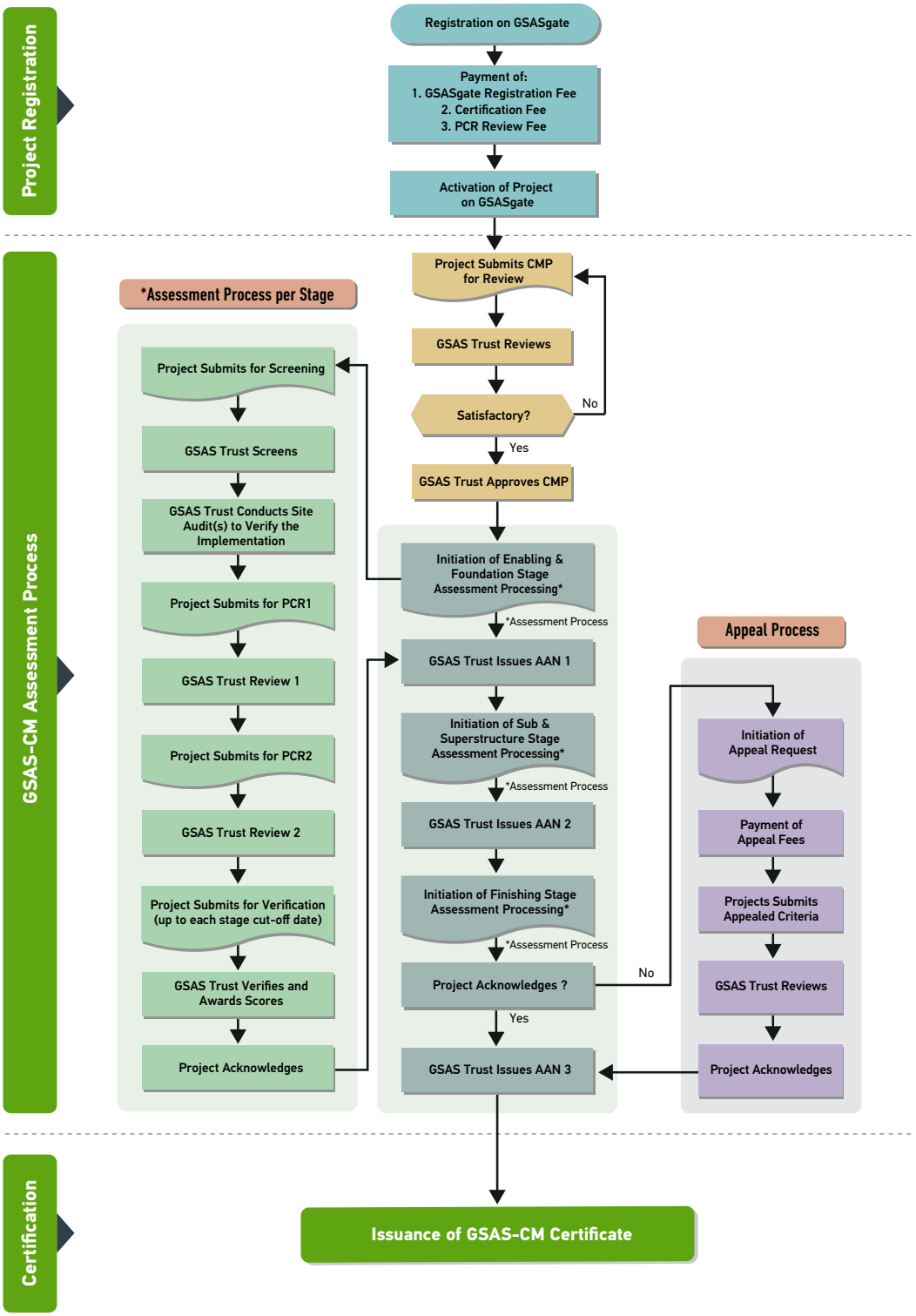

Figure 45: GSAS-CM Certification Flowchart - PCR Route

4.2.3.1 Step 1: Registration of the Project at *GSASgate*™

1. The project registration at *GSASgate*™ is the starting point for all projects targeting GSAS-CM certificate. The Project Owner/Client/main contractor is required to nominate a GSAS-CM Service Provider (GSAS-CM SP) with a valid GSAS corporate license preferably during the start of construction mobilization to ensure the first stage of GSAS-CM certification requirements are identified and a proper request for proposals are issued at the start of the project development.

2. The nominated Service Provider is required to appoint a GSAS-CM Certified Green Professional (GSAS-CM CGP) with a valid license who is responsible for managing the certification. GSAS-CM CGP will register the project at *GSASgate*™ and pay the associated fees for the gateway registration and project certification to activate the project account. Projects will choose either to follow the standard route of project certification as mentioned below, or the PCR and pay the associated fees.

3. PCR is an integrated delivery process for project certification. It is considered as an alternative route; optional for project teams to follow in order to obtain additional technical support from GSAS Trust. The project technical team are invited to meet GSAS Trust technical team through face-to-face meetings and/ or video conferencing to obtain clarifications regarding queries on the project certification management and criteria assessments during the certification process.

4. All applicable fees can be downloaded from the “Resource Center” on GORD website.

5. The project will then be activated on *GSASgate*™.

6. A detailed process of *GSASgate*™ submission is illustrated in *GSASgate*™ manual, which can be downloaded from the “Resource Center” on GORD website.

4.2.3.2 Step 2: Assessment of GSAS Construction Management Plan (GSAS-CMP)

1. Upon activation of the project account, the project shall start using the facility of *GSASgate*™ to support the sustainability assessment of the project deliverables.

2. The project team submits GSAS-CMP to GSAS Trust for assessment.

3. The project team resubmits GSAS-CMP if needed and based on GSAS Trust issued comments.

4. GSAS Trust approves GSAS-CMP when GSAS requirements have been met.

4.2.3.3 Step 3: Assessment of the Project Construction Activities

1. Upon CMP approval, the project shall submit the required documentation for each construction stage.

2. GSAS Trust will assess the project's deliverables, and the project will adhere to GSAS Trust comments communicated to the client in order to adequately attain each criterion score.

3. The project will have specific number of submissions and review as indicated in *GSASgate*™ manual. A detailed process of *GSASgate*™ submission is illustrated in *GSASgate*™ manual, which can be downloaded from the "Resource Center" on GORD website.

4.2.3.4 Step 4: Conducting Site Audits

1. GSAS Trust will conduct the first site audit after the commencement of Stage 1, upon CMP approval.

2. GSAS Trust will conduct rest of audits for the assessment of GSAS-CM criteria. During audits, auditors will cross-check the implementation of the requirements of GSAS-CMP.

3. The audits are undertaken for each of the three construction stages (the enabling & foundation stage; the substructure & superstructure stage; and the finishing stage).

4.2.3.5 Step 5: Obtaining Audit Advisory Notices (AAN's)

1. After successful review of the submitted documents and conducting the site audit(s) for the construction stage under evaluation, GSAS Trust issues an interim AAN indicating the evaluation scores for each criterion targeted and assessed under the designated construction stage.

2. It is not necessary that the project achieves the same score for each criterion at each construction stage. The scores are provided independently for each criterion on the basis of the assessment conducted for each construction stage.

3. The considered cut-off date for GSAS-CM certification is at the time the contractor requests the client for inspection of the substantially completed works.

4. As a part of the process, and prior to final acknowledgment of the project scores, the project team may initiate an appeal for the criterion score that requires revisiting after paying the associated fees for the appeal process to GSAS Trust to revalidate and award the final score.

5. The project rating is determined by averaging out the scores from the three stages.

4.2.3.6 Step 6: Obtaining GSAS-CM Certificate

1. Upon successful completion of the third construction Stage and the issuance of the 3rd AAN, GSAS-CM Certificate is issued to the project, for having conformed to the requisite performance as set out in GSAS-CM Assessment and Guideline manual.

2. A Plaque of Recognition is issued upon the project request and posted after paying the applicable fees. The plaque indicates the final GSAS-CM rating achieved by the project.

4.3 ROLES AND RESPONSIBILITIES

4.3.1 GSAS-CM CGP Roles & Responsibilities

4.3.1.1 A project GSAS-CM CGP may belong to a design consultancy firm, contractor, program/ project management firm, construction management firm, construction supervision firm or an independent sustainability advisory firm that holds a valid GSAS Service Provider corporate license type. See subsequent sections for applicable license types.

4.3.1.2 The contractor must hold a valid GSAS Construction Management Service Provider license. See subsequent sections for the applicable license types.

4.3.1.3 Roles and Responsibilities of GSAS-CM CGP during the construction stage of the project include, but are not limited to:

1. Register and pay all associated fees for GSAS-CM Certification including GSASgate™ registration fees, audit visits fees, and GSAS-CM certificate fees.
2. To develop GSAS-CMP in consultation with the staff and sub-contractor teams and providing complete and accurate information in GSAS-CMP.
3. Assess the construction processes and practices on-site using the latest GSAS Construction Management assessment manual.
4. Collect construction data, solicit information from the sub-contractors, and prepare plans, submittals and all other supporting documents necessary to substantially verify the claimed scores for each criterion.
5. Demonstrate compliance to GSAS assessment claimed scores through monitoring and full disclosure of construction practices on-site as outlined in GSAS assessment and guidelines.
6. Verify the plans through joint site audits by the contractor and GSAS Trust; and report the findings and rectifications required to conform to the requirements and targets for each GSAS criterion.

7. Submit all the required documents to GSAS Trust for review and comments.
8. Obtain GSAS Construction Management Certificate with the target rating.

4.3.2 GSAS Trust Roles & Responsibilities

1. Manage the certification process from the certification body side and ensure that the project is in line with all GSAS requirements.
2. Assess compliance with environmental approval and specific standards submitted to attain several scores.
3. Initiate the site audit process in coordination with the project CGP.
4. Provide a briefing about GSAS Site Audit procedures and documentation requirement.
5. Conduct a number of audit visits at various stages of the construction.
6. Review of the submitted data and evidence by GSAS-CM CGP and verify the validity of the provided information.
7. Advise the project CGP for the submittal requirements of the required criteria for the assessment stage.

CHAPTER 5 GSAS OPERATIONS CERTIFICATION

5.1 INTRODUCTION

GSAS-OP certification program can be applied to new or existing buildings where the tenant/ user has followed a high level of sustainability practice in building operations to: optimize energy consumption; optimize water consumption; minimize waste disposal and/or adopt sustainable waste treatment/disposal practices; and, maintain a healthy, productive and effective indoor environment. There are five categories in this certification including Energy, Water, Indoor Environment, Waste Management and Environmental Policy & Awareness.

The certification requires information on computation or documentation that the project needs to submit to demonstrate compliance with the requisite parameters. The evaluation of the facility or tenant operations over the course of its lifetime is required, based on the repeated data collection for the whole year cycle. This certification ensures that the Energy, Water, Indoor Environment, Facility Management, Waste Management and Environmental Policy & Awareness performance of the building during the assessment period meet the targeted level of the sustainability standard.

GSAS-OP application for certification is guided by the following:

5.1.1 Initial Certification

The building under operation can apply for the certification at any time based on the as-built specifications. The requirements include submission of the energy and water metered data for the past 12 months excluding the periods in which building was partially occupied. This is in addition to the submission of results of occupant surveys to be conducted once at the time of the application, if the targeted criterion requires it.

Further, the building under operation with no metered data for energy and water consumption can also apply for the certification, however the best rating that can be offered to such project is "GOLD Rating".

5.1.2 Recertification

The recertification will require submission of at least 12 months of data collected on energy and water consumption and the results of occupant surveys conducted twice in the year preceding recertification. If the project opts to apply for improved certification rating for some reason (e.g. due to improvement in energy efficiency features of building), the application for the same can be submitted any time to GSAS Trust with necessary evidences.

Recertification fees will be applicable as per GSAS Trust policy.

5.1.3 Validity & Data Monitoring

The certificate is valid for four years after which the building must be reassessed to maintain continued certification. It is a pre-requisite for the continuity of the certificate to implement continuous monitoring and provide GSAS Trust with the annual data for energy and water consumption.

Based on the assessment at the time of renewal, the certification level may be improved, maintained or lowered. Renewal is subject to having at least 36 months of data collected from building operations.

5.1.4 Occupant Survey

GSAS occupant survey is a method to evaluate the degree to which buildings satisfy the users. The survey assesses the occupant well-being and interactions with the indoor environment and facility management by analyzing the occupant feedback for a successful management and operational practices improvement. There are several criteria in GSAS operations which require the successful completion of an occupant survey including all Indoor Environment criteria and the Facility Management criterion.

A satisfactory sample size for the occupant survey to yield valid and accurate survey responses must be demonstrated. The Project will check the actual target population (occupants) to reduce the margin of error and ensure a higher confidence level. The acceptable sample size for the occupant survey is a minimum of 30 valid responses or 5% of the target population, whichever is higher.

5.2 GSAS-OP ASSESSMENT SCHEMES AND MARKS

The intent of GSAS Operations is to assess and rate the environmental performance of new and existing buildings. The criteria and measurements focus on verifying the performance of the facilities and ensuring that the occupant's health and comfort are maintained.

There are two types of assessment Schemes and two types of Marks offered under GSAS Operations certification as described below:

5.2.1 Operations Standard Scheme

The Standard Scheme covers Energy, Water, Waste Management, Facility Management and Environmental Policy & Awareness criteria. Projects which show compliance will receive a GSAS-OP certificate and plaque.

5.2.2 Operations Premium Scheme

The Premium Scheme covers Indoor Environment category in addition to the Standard Scheme criteria. Projects which show compliance will receive a GSAS-OP certificate and plaque.

5.2.3 Energy Neutral Mark

The Energy Neutral Mark covers only Energy category in addition to providing 100% of annual energy requirements of the project through on-site renewable energy sources. Projects which show compliance will receive an "Energy Neutral Mark" and plaque.

An Energy Neutral building or Zero-Energy Building can be defined as a building that produces enough renewable energy to meet its own annual energy consumption requirements, thereby reducing the use of non-renewable energy in the building sector.

5.2.4 Healthy Building Mark

The Healthy Building Mark covers only Indoor Environment category in addition to Waste Management and Facility Management criteria. Projects which show compliance will receive a "Healthy Building Mark" and plaque.

Mandatory Requirements and Important Notes

1. Standard scheme covers [E], [W], [WM], [FM] & [EPA], where:
    - Targeting all five criteria is mandatory to obtain GSAS certification.
    - Compliance in [E] Energy and [W] Water criteria with a minimum Level of 1 in each, is mandatory to obtain GSAS Gold certification.
    - Maximum attainable rating for Standard scheme is Gold rating.
2. Premium scheme covers [E], [W], [IE], [WM], [FM] & [EPA], where:
    - Targeting all six criteria is mandatory to obtain GSAS certification.
    - Compliance in [E] Energy, [W] Water and [IE.2] Air Quality criteria with a minimum Level of 1 in each, is mandatory to obtain GSAS Platinum certification or above.
3. Energy Neutral Mark covers only [E], where:
    - Targeting Energy criteria is mandatory to obtain Energy Neutral Mark.
    - Compliance in [E] Energy, with a minimum Level of 3 in each, is mandatory to obtain Energy Neutral Mark.
    - Compliance with 100% of annual energy requirements is mandatory to obtain Energy Neutral Mark.
4. Healthy Building Mark covers [IE], [WM] & [FM], where:
    - Targeting all three criteria is mandatory to obtain GSAS certification.
    - Compliance in [WM] Waste Management and [FM] Facility Management criteria with a minimum Level of 1 is mandatory to obtain Healthy Building Mark.

- Compliance in [IE] Indoor Environment criteria with a minimum Level of 1 is mandatory to obtain GSAS certification, except [IE.2] Air Quality.
- Compliance in [IE.2] Air Quality criterion with a minimum Level of 2 is mandatory to obtain Healthy Building Mark.

5. An Air Quality Validation Audit is compulsory after two years from certificate issuance for projects targeting Premium Scheme or Healthy Building Mark. GSAS Trust will conduct on-site measurements for air quality parameters to ensure compliance with specified limits in GSAS Operation manual. A non-compliance note will be issued for those projects showing non-compliance. Project will submit a Corrective Action Report within 2 months and a Verification Audit will be scheduled accordingly to ensure that the Corrective Action Plan action issues have been addressed.

5.3 GSAS-OP CERTIFICATION PROCESS

GSAS Operations certification process flowchart is shown in Figure 46. The PCR route is applicable upon project request and for specific fees. The certification process for obtaining GSAS-OP certificate is listed in the forthcoming sections.

Step 1: Register the Project at GSASgate™

Step 2: Assess the Operations of the Facility

Step 3: Initiate Appeals of the Contested Criteria

Step 4: Obtain GSAS-OP Certificate

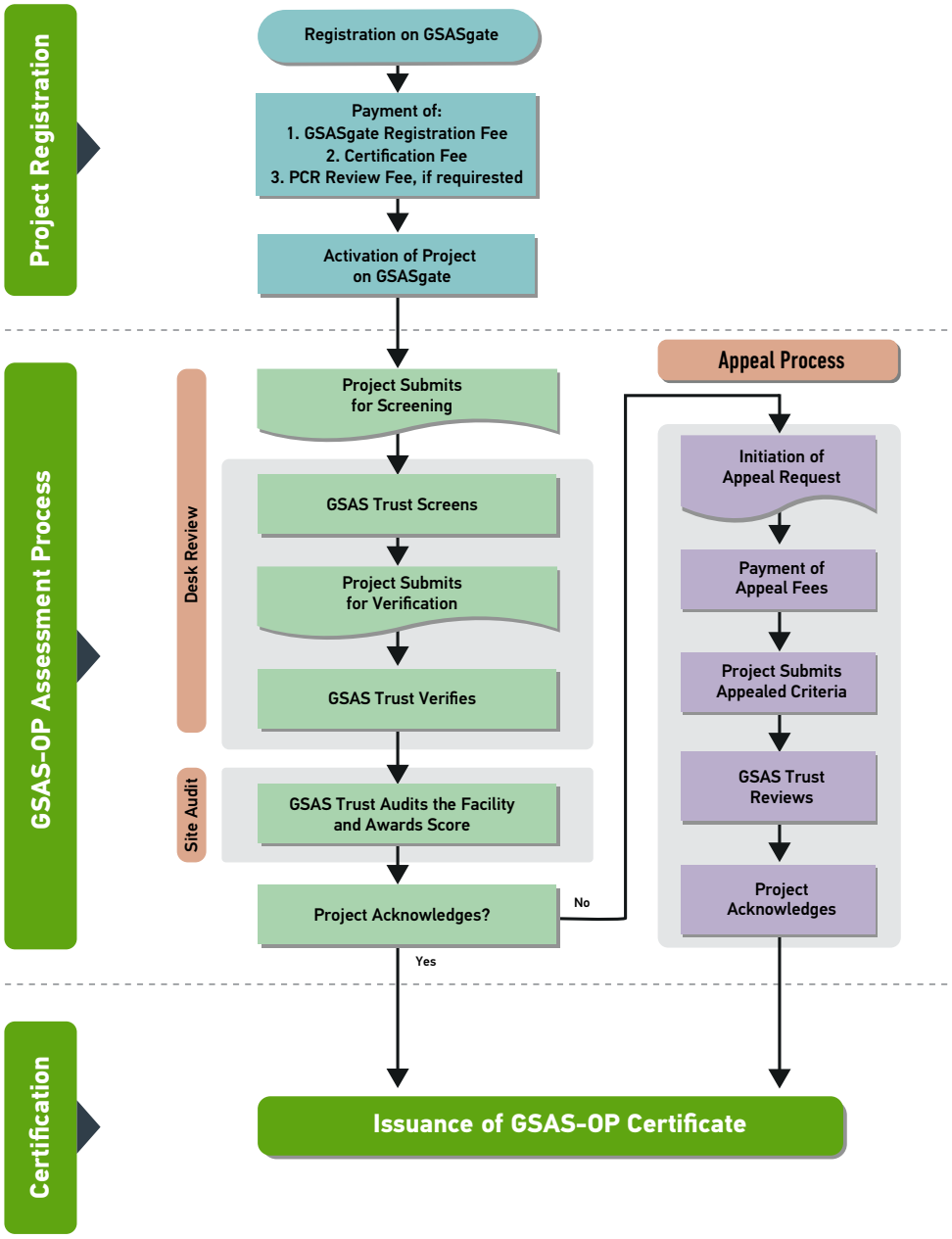

Figure 46: GSAS-OP Certification Flowchart

The steps for managing GSAS-OP certification process are as follows:

5.3.1 Step 1: Register the Project at *GSASgate™*

1. The Project Owner/Client/Facility Management is required to nominate a GSAS-OP Service Provider (GSAS-OP SP) with a valid GSAS corporate license.

2. The nominated GSAS Service Provider appoints a GSAS-CGP with a valid CGP-OP license.

3. The appointed GSAS-CGP registers at GSASgate™ and pays the associated fees for the gateway registration and project certification to activate the project account. Projects will choose either to follow the standard route of project certification as mentioned below, or the PCR and pay the associated fees.

4. PCR is an integrated delivery process for project certification. It is considered as an alternative route; optional for project teams to follow in order to obtain additional technical support from GSAS Trust. The project technical team are invited to meet GSAS Trust technical team through face-to-face meetings and/ or video conferencing to obtain clarifications regarding queries on the project certification management and criteria assessments during the certification process.

5. All applicable fees can be downloaded from the “Resource Center” on GORD website.

6. The project will then be activated on GSASgate™.

7. A detailed process of GSASgate™ submission is illustrated in GSASgate™ manual, which can be downloaded from the “Resource Center” on GORD website or on GSASgate™.

5.3.2 Step 2: Assess the Operations of the Facility

The following procedures in GSAS Operations assessment process applies for both the Standard and Premium schemes:

1. The project team submits the documents for screening.
2. GSAS Trust screens the submittals.
3. The project team submits the facility operations data and documents for GSAS Trust verification.
4. GSAS Trust reviews the submittals.
5. GSAS Trust conducts site audits to verify the project team's submittals.
6. The project team resubmits to comply with GSAS Trust comments on the submittals.
7. GSAS Trust approves and issues GSAS Operations certificate, performance labels, and awards the facility with a Plaque of Recognition for having conformed to GSAS Operations standard scheme assessments.

5.3.3 Step 3: Initiate Appeals of the Contested Criteria

1. The project team initiates the appeal process for the criterion score that requires revisiting.
2. The project team pays the associated fees for the appeal process.
3. GSAS Trust revalidates the appealed criterion and awards the final score.
4. The project team acknowledges the final score.

5.3.4 Step 4: Obtaining GSAS-OP Certificate

1. Upon successful completion of the criteria scores, GSAS Operations Certificate is issued to the project, for having conformed to the performance as detailed in GSAS Operations Assessment and Guideline manual and a Plaque of Recognition is issued indicating the final GSAS Operations rating, as achieved by the project.
2. GSAS Operations certificate is issued only after completing the audits and verification report indicating the final GSAS star rating.

5.4 ROLES AND RESPONSIBILITIES

5.4.1 GSAS-OP CGP Roles & Responsibilities

5.4.1.1 The project GSAS-CGP may be a developer, or belong to a facility management firm, maintenance contractor, program/project management firm, or an independent sustainability advisory consultant firm that holds a valid GSAS Service Provider corporate license type. See subsequent sections for applicable license types.

5.4.1.2 Roles and Responsibilities of GSAS-OP CGP during the operation stage of the project include, but are not limited to:

1. Register and pay all the associated fees for GSAS Operations Certification including GSASgate™ Registration fees, Audit Visits fees, and GSAS Operations Certificate fees. Please refer to Section 7 for the Certification Fees and Charges.
2. Lead the overall planning, scheduling and coordinating for compliance.
3. Ensure seamless audits by extending the required assistance and necessary support for the successful implementation of audits and the collection of data.
4. Collect data, solicit information, and prepare plans, submittals and all other supporting documents necessary to substantially verify the claimed scores for each criterion.
5. Sign-off all submittals and evidence relevant to the building parameters for the issuance of Operations Certification.
6. Sufficiently demonstrate that the evidence, such as reports, photographs, data sheets and other documents support the measurement principles of GSAS criterion before being submitted to GSAS Trust for review.
7. Obtain GSAS Operations Certificate.

5.4.2 GSAS Trust Roles & Responsibilities

1. Manage the certification process from the certification body side and ensure that project is in line with all GSAS requirements.
2. Initiate the site audit process in coordination with the project CGP.
3. Provide a briefing regarding GSAS Site Audit procedures and documentation requirement.
4. Conduct a number of audit visits as appropriate.

5. Review of the submitted data and evidence by GSAS-OP CGP and verify the validity of the provided information.

6. Advise the project CGP for the submittal requirements of the required criteria for the assessment stage.

7. Report the findings and follow-up action; if required.

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