



VGBC | Vietnam Green Building Council
Hội đồng Công trình xanh Việt Nam®

LOTUS New Construction V1

Summary of changes from NR V2.0 & MFR Pilot (Draft)

June 2018



DRAFT VERSION

DRAFT

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1. Introduction

LOTUS New Construction (LOTUS NC) is a new LOTUS Rating System built by merging LOTUS Non-Residential and LOTUS Multi-family Residential in one single system.

LOTUS NC applies to all types of new building constructions and major building refurbishments at the exception of single-family houses and buildings with a Gross Floor Area (GFA) lower than 2,500 m².

LOTUS NC V1 is superseding both LOTUS NR V2.0 (which was released in June 2015) and LOTUS MFR Pilot (which was released in October 2015).

Not only LOTUS NC V1 is the result of merging LOTUS NR and LOTUS MFR, but also a number of changes have been brought to improve the content of credits by:

- making updates following new standards, codes and regulations (e.g. compliance with QCVN 09:2017/BXD)
- refining requirements (e.g. thresholds in credit Eco-4 Green Roof to be decreased to 20% and 40% of green roof area for 1 and 2 points)
- enlarging the scope (e.g. high-volume low-speed fans to be considered in the H-6 Thermal Comfort credit),
- fixing existing mistakes (e.g. mistakes in Figure H.2 and Table H.4 of credit H-6 External Views have been fixed)
- providing clearer explanations where needed (e.g. clearer descriptions given for the different types of green roofs, for quality views, etc.)

Though most changes impact both LOTUS NR V2.0 and LOTUS MFR Pilot at the same time (as they were relatively similar systems), the list of changes presented in the following sections separates changes from NR V2.0 and changes from MFR Pilot for more clarity.

2. List of changes from LOTUS NR V2.0

Changes brought from the LOTUS Non-Residential V2.0 Technical Manual are listed in the following tables.

2.1 General changes

Item	Modifications
Weighting	The total number of point available in LOTUS NC V1 is of 100 points + 8 bonus points for Innovation whereas this total was of 110 points + 8 bonus points for Innovation in LOTUS NR V2.0.
Prerequisites	<ul style="list-style-type: none"> ▪ A large number of prerequisites have been removed <ul style="list-style-type: none"> - WP-PR-1, Man-PR-2: regulations are well enforced and new construction projects will comply with the requirements that were includes in these prerequisites. - Eco-PR-1, A-PR-1: these prerequisites required time and effort from project team for no real green benefit beyond making reports/documentation - A-PR-2, WP-PR-3, Man-PR-1: requirements that were included in these prerequisites are now considered in credits for points.
Credits	<ul style="list-style-type: none"> ▪ The following credits have been removed from LOTUS NR V2.0: <ul style="list-style-type: none"> - M-1 Materials Reuse - M-2 Materials with Recycled Content - M-4 Sustainable Timber and Rapidly Renewable Materials - Eco-1 Construction Environmental Management Plan - A-5 Local Materials - CY-3 Access for People with Disabilities ▪ The following credits have been added in LOTUS NC V1: <ul style="list-style-type: none"> - M-1 Reduced Concrete Use - M-2 Sustainable Materials - WP-5 Construction Activity Pollution Control - CY-3 Community Awareness

2.2 Changes in the certification process

Section	Modifications
LOTUS NC Certification Process	LOTUS Full Certification is now valid for 5 years provided that energy and water consumption data is submitted on a yearly basis.
Codes and Standards Referenced in LOTUS	The list of codes and standards has been updated.
LOTUS Provisional Certification Stage	<p>At Provisional Certification stage, the following credits are not available as it is not possible for projects to provide satisfying evidence of compliance in the design stage:</p> <ul style="list-style-type: none"> • M-2 Sustainable Materials • WP-2 Demolition and Construction Waste • CY-3 Community Awareness • Man-3 Commissioning (Strategies to ensure a proper handover to the building users and to conduct commissioning activities during the operations of the building) • Man-4 Maintenance • Man-5 Green Management <p>As such, projects only need to achieve a total of 34 points to obtain Provisional Certification.</p>
Provisional Certificate	<p>This section has been clarified to explain that:</p> <ul style="list-style-type: none"> ▪ No certification level is awarded to projects at Provisional Certification stage, only an indication that the project is on-track to achieve an anticipated level of certification at Full Certification stage is given. ▪ A Provisional Certificate can be issued by the VGBC on demand by the Applicant.
LOTUS NC Submissions	The whole section has been re-written to improve clarity.
Design-Build project	A new section has been added to describe the modifications in the Provisional Certification stage for design-build projects.

2.3 Changes in categories

	Prerequisite or Credit removed from LOTUS NC
	New credit created for LOTUS NC

Energy

NR V2.0 Credit/PR	NC V1 Credit/PR	Description of the changes
E-PR-1 Passive Design	E-PR-1 Passive Design	<ul style="list-style-type: none"> No changes.
E-PR-2 Total Building Energy Use	E-PR-2 Minimum Energy Efficiency Performance	<ul style="list-style-type: none"> The E-PR-2 prerequisite is now a stand-alone prerequisite renamed as “Minimum Energy Efficiency Performance”. Requirements: Two changes have been made in line with QCVN 09:2017/BXD: <ul style="list-style-type: none"> Sub-metering is not required anymore Requirements on SHGC values are set for both vertical glazing and skylights Project types not included in the scope of QCVN 09:2017/BXD (such as: factories, cultural buildings, sports centers, etc.), should comply with requirements on R-values, SHGC values for glazing and efficient of HVAC systems, not with requirements on LPD values.
E-PR-3 Total Building Energy Use	E-PR-3 Total Building Energy Use	<ul style="list-style-type: none"> LOTUS Guidelines – Energy Performance Calculation Method have been updated in line with QCVN 09:2017/BXD
E-1 Total Building Energy Use (14 points)	E-1 Total Building Energy Use (14 points)	
E-2 Building Envelope (4 points)	E-2 Building Envelope (3 points)	<ul style="list-style-type: none"> The number of points available has been reduced from 4 points down to 3 points. In Option A, points are now awarded for every 15% reduction of building’s average OTTV compared to QCVN 09:2017/BXD requirements Requirements in Option B have been split in 4 strategies for more clarity: <ul style="list-style-type: none"> Strategy B1: Solar radiation Strategy B2: West facing façade Strategy B3: WWR on West and East facing facades Strategy B4: Effective external shadings Projects with no west-facing façade and no east-facing façade are directly awarded 2 points in Strategy B2 and Strategy B3 is not applicable.

<p>E-3 Natural Ventilation and Air-conditioning (6 points)</p>	<p>E-3 Building Cooling (6 points)</p>	<ul style="list-style-type: none"> ▪ The credit has been renamed “Building Cooling” ▪ Strategy A: Natural Ventilation For locations where the average maximum temperature during the hottest month is below 30°, a space shall be considered naturally ventilated where the total operable opening area is no less than 5% of the floor area (instead of 4% in NR V2.0). This change has been made according to section 2.2.1 of QCVN 09:2017/BXD. ▪ Strategy B: Air-conditioning <ul style="list-style-type: none"> - In line with QCVN 09:2017/BXD where efficiency of non-ducted air-conditioners is assessed against CSPF instead of COP, the following changes have been made: <ul style="list-style-type: none"> • one new requirement has been added: 1 point for every 20% improvement of CSPF for non-ducted air-conditioners with a cooling capacity under 12 kW • a new table with minimum CSPF requirements has been added. • a new formula has been added to calculate the percentage of CSPF Improvement - Tables including minimum COP requirements have been updated according to QCVN 09:2017/BXD and ASHRAE 90.1-2013. - VAV systems now need to be high-performance VAV systems to comply with Strategy B2.
<p>E-4 Artificial Lighting (3 points)</p>	<p>E-4 Artificial Lighting (3 points)</p>	<ul style="list-style-type: none"> ▪ Strategy A: Reduction of Light Power Density <ul style="list-style-type: none"> - Table E.8 including maximum LPD values for different types of buildings/spaces has been updated according to QCVN 09:2017/BXD - For building types not listed in Table E.8 (such as: manufacturing facilities, museum, gymnasium, etc.), values listed in Table 9.5.1 of ASHRAE 90.1-2007 should be considered or a space-by-space method should be followed. ▪ Strategy B: Lighting Control System The installation of occupancy and daylight sensors (that were required in QCVN 09:2013/BXD) is now contributing towards the achievement of Strategy B requirements.
<p>E-5 Energy Monitoring and Management (2 points)</p>	<p>E-5 Energy Monitoring and Management (2 points)</p>	<ul style="list-style-type: none"> ▪ The following changes have been brought in the strategy Power Monitoring System: <ul style="list-style-type: none"> - Separate floors, separate tenancies, lifts and escalators do not need to be monitored individually - Energy uses should be monitored with permanent meters recording both consumption and demand at intervals of one hour or less - Where applicable, virtual meters can be used instead of actual energy meters
<p>E-6 Renewable Energy (2 points)</p>	<p>E-7 Renewable Energy (2 points)</p>	<ul style="list-style-type: none"> ▪ No changes

Water

NR V2.0 Credit/PR	NC V1 Credit/PR	Description of the changes
W-PR-1 Water Efficient Fixtures	W-PR-1 Water Efficient Fixtures	<ul style="list-style-type: none"> Requirements for the prerequisite have been raised to a minimum of 20% reduction of total building domestic water consumption through fixtures in comparison to baseline.
W-1 Water Efficient Fixtures (5 points)	W-1 Water Efficient Fixtures (5 points)	<ul style="list-style-type: none"> Requirements for points have all been raised by 5% of reduction of total building domestic water consumption through fixtures in comparison to baseline. Kitchen faucets used exclusively for filling operations should not be considered Flow rates for faucets and showerheads should either be based on pressure of 3 bars or on actual flow rates measured on-site In case faucets with auto control are installed in the building, the baseline water use should be calculated with a 15 seconds duration of use and the design water use should be calculated with a 12 seconds duration of use.
W-2 Water Efficient Landscaping (2 points)	W-2 Water Efficient Landscaping (2 points)	<ul style="list-style-type: none"> The quality of the water used for irrigation should meet the requirements of QCVN 39:2011/BTNMT National technical regulation on Water Quality for irrigated agriculture.
W-3 Water Monitoring (2 points)	W-3 Water Metering (1 point)	<ul style="list-style-type: none"> The credit has been renamed “Water Metering” The number of points available has been reduced from 2 points down to 1 point. Requirements on central water monitoring system have been removed The list of major water flows to monitor with permanent water meters (as applicable to the projects) is now provided
W-4 Sustainable Water Use Solutions (4 points)	W-4 Sustainable Water Use Solutions (5 points)	<ul style="list-style-type: none"> The number of points available has been increased from 4 points up to 5 points. 3 strategies are now included: <ul style="list-style-type: none"> Strategy A: Water recycling/reuse/harvest Strategy B: Swimming Pool Water Efficiency Strategy C: Cooling Tower Water Efficiency For strategy A: Water recycling/reuse/harvest, a list of standards with minimum quality requirements at the point of delivery for recycled, reused or harvested water is included: <ul style="list-style-type: none"> QCVN 39:2011/BTNMT QCVN 02:2009/BYT NSF/ANSI Standard 350

Materials

NR V2.0 Credit/PR	NC V1 Credit/PR	Description of the changes
M-1 Material Reuse (2 points)	/	<ul style="list-style-type: none"> ▪ Credit removed from LOTUS NC.
M-2 Materials with Recycled Content (3 points)	/	<ul style="list-style-type: none"> ▪ Credit removed from LOTUS NC.
/	M-1 Reduced Concrete Use (2 points)	<ul style="list-style-type: none"> ▪ New credit to encourage projects to minimize the use of concrete in buildings. ▪ 3 strategies are included: <ul style="list-style-type: none"> - Strategy A: Reduce concrete usage for slabs - Strategy B: Reduce concrete usage for beams and columns - Strategy C: Reduce concrete usage for non-structural systems ▪ For compliance, projects should use solutions such as: pre-stressed elements, structural steel, steel-concrete composite materials, drywall partitions, etc.
/	M-2 Sustainable Materials (6 points)	<ul style="list-style-type: none"> ▪ New credit to encourage the use of sustainable materials which include reused materials, materials with recycled content, rapidly renewable materials, sustainable timber and materials third party certified based on whole lifecycle analysis. ▪ Points are based on the percentage of the total value of the materials in the project that is from sustainable materials ▪ The different types of sustainable materials are given different “weights” (referred to as “sustainability value”) to consider in calculations ▪ Also, additional features to the sustainable materials (such as: materials manufactured in an ISO 14001 certified facility, environmental product declarations, local materials, etc.) are also considered in calculations through sustainability factors
M-3 Non-baked Materials (2 points)	M-3 Non-baked Materials (2 points)	<ul style="list-style-type: none"> ▪ In line with circular 13/2017/TT-BXD, thresholds have been raised from 50% and 70% to 80% and 100% for 1 and 2 points. ▪ Calculations can now be based either on area (m²) or on volume (m³) ▪ Column cladding should be included in the calculations but glass and laminate partitions should be excluded.
M-4 Sustainable Timber and Rapidly Renewable Materials (2 points)	/	<ul style="list-style-type: none"> ▪ The credit has been removed from LOTUS NC.

Ecology

NR V2.0 Credit/PR	NC V1 Credit/PR	Description of the changes
Eco-PR-1 Environment	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
Eco-1 Construction Environmental Management Plan (2 points)	/	<ul style="list-style-type: none"> Credit removed from LOTUS NC.
Eco-2 Habitat Restoration (3 points)	Eco-1 Habitat Restoration (2 points)	<ul style="list-style-type: none"> The number of points available has been increased from 3 points down to 2 points. A new exception has been added: For schools, turf grass areas designated for sports uses may be excluded from the calculations. The area of turf grass should then be deducted from the site area As.
Eco-3 Development footprint (2 points)	Eco-2 Development footprint (2 points)	<ul style="list-style-type: none"> Another strategy can be followed to increase the open space of the project, which is to make the roof accessible to occupants. Will qualify as open space, the area of the roof that is accessible to all occupants and that is vegetated or provides social / recreational value (seating, swimming pool, playground, etc.) A calculation section is now included.
Eco-4 Green Roof (2 points)	Eco-3 Green Roof (2 points)	<ul style="list-style-type: none"> Thresholds have been decreased to 20% and 40% of green roof area for 1 and 2 points. Clearer descriptions are given for extensive, semi-intensive and intensive green roofs. Calculation method has been updated: <ul style="list-style-type: none"> Area of the roof covered with solar PV systems and solar water heating systems should be deducted from the entire roof area in the calculations. Semi-intensive and intensive green roofs are now considered together in calculations

Waste & Pollution

NR V2.0 Credit/PR	NC V1 Credit/PR	Description of the changes
WP-PR-1 Wastewater Treatment	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
WP-1 Refrigerants (3 points)	WP-1 Refrigerants (2 points)	<ul style="list-style-type: none"> The number of points available has been reduced from 3 points down to 2 points.
WP-PR-3 Demolition and Construction Waste	WP-PR-1 Demolition and Construction Waste	<ul style="list-style-type: none"> No changes
WP-2 Demolition and Construction Waste (2 points)	WP-2 Demolition and Construction Waste (2 points)	<ul style="list-style-type: none"> No changes
WP-3 Dedicated Recycling Storage Area (2 points)	WP-3 Operation Waste Management (1 point)	<ul style="list-style-type: none"> The credit has been renamed "Operation Waste Management" The number of points available has been reduced from 2 points down to 1 point. The size of the storage area should not be calculated based on the total gross floor area but should be based on the waste generation and frequency of recycling pick-up of the project. Also, short-term storage areas located all over the project with smaller bins allocated for the different types of recyclable waste generated should be provided.
WP-PR-4 Light Pollution Minimization	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
WP-4 Light Pollution Minimization (1 point)	WP-4 Light Pollution Minimization (1 point)	<ul style="list-style-type: none"> Requirements on automatic lighting shutoff strategies from WP-PR-4 in LOTUS NR V2.0 are now required to achieve 1 point.
/	WP-5 Construction Activity Pollution Control (1 point)	<ul style="list-style-type: none"> New credit aiming to limit pollution arising from construction activities Measures should be implemented for erosion, sediment, dust and pollutant control.

Health & Comfort

NR V2.0 Credit/PR	NC V1 Credit/PR	Description of the changes
H-PR-1 Indoor Smoking	H-PR-1 Indoor Smoking	<ul style="list-style-type: none"> Outdoor designated smoking areas should be indicated with signs and should be equipped with ashtrays, trash bins and with extinguishers if located near flammable materials.
H-1 Fresh Air Supply (2 points)	H-1 Fresh Air Supply (2 points)	<ul style="list-style-type: none"> No changes
H-2 CO ₂ Monitoring (2 points)	H-2 CO ₂ Monitoring (1 point)	<ul style="list-style-type: none"> The number of points available has been reduced from 2 points down to 1 point.
H-3 Hazardous Materials (3 points)	H-4 Low Emission Products (3 points)	<ul style="list-style-type: none"> The credit has been renamed Low Emission Products and is now split in 5 strategies: <ul style="list-style-type: none"> Strategy A: Paints and coatings Strategy B: Adhesives and sealants Strategy C: Floorings Strategy D: Composite wood Strategy E: Ceilings, partitions and insulation Criteria to define which products are considered as low-VOC and as low-formaldehyde have been broadened.
H-4 Daylighting (3 points)	H-5 Daylighting (3 points)	<ul style="list-style-type: none"> Spaces that are not compatible with the provision of daylighting (such as: auditoriums and conference rooms dedicated to video conferencing) can be exempted from this credit.
H-5 External Views (2 points)	H-6 External Views (2 points)	<ul style="list-style-type: none"> Spaces that are not compatible with the provision of external views (such as: auditoriums, conference rooms dedicated to video conferencing and gymnasiums) can be exempted from this credit. Strategy A: Some mistakes in Figure H.2 and Table H.4 have been fixed. Strategy B: Explanations on how an area can qualify as an area with quality views have been updated to provide more details and clarity.
H-6 Thermal Comfort (2 points)	H-7 Thermal Comfort (2 points)	<ul style="list-style-type: none"> Air-conditioned spaces and mixed-mode ventilated spaces: Consistent indoor conditions to maintain should be a dry-bulb temperature set between 24° to 26°C (instead of an operative temperature set between 24° to 26°C and a relative humidity set below 70% as required in LOTUS NR V2.0) Non-air-conditioned spaces: Installation of high-volume low-speed (HVLS) fans is included as a strategy to increase indoor air velocity in method 2 of compliance for non-air-conditioned spaces

Adaptation & Mitigation

NR V2.0 Credit/PR	NC V1 Credit/PR	Description of the changes
A-PR-1 Flooding Resistance	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
A-1 Flooding Resistance (1 point)	A-1 Flooding Resistance (1 point)	<ul style="list-style-type: none"> Requirements on flood risk report from A-PR-1 in LOTUS NR V2.0 are now required to achieve 1 point in the credit.
A-2 Storm Water Runoff (2 points)	A-2 Stormwater Management (2 points)	<ul style="list-style-type: none"> The credit has been renamed “Stormwater Management” The credit has been split in 2 options: <ul style="list-style-type: none"> Option A: Site Perviousness Option B: Stormwater Control Option A is the same as in NR V2.0 but is only applicable to projects that have a non-building area + green roof area that makes up more than 20% of the total site area or makes up more than 200 m² Option B requires projects to use stormwater control practices to help capture and/or infiltrate stormwater in order to decrease volume of on-site stormwater runoff from the 2-year storm event.
A-3 Heat Island Effect (2 points)	A-3 Heat Island Effect (2 points)	<ul style="list-style-type: none"> In calculations, areas covered with skylights should be deducted from the roof area.
A-PR-2 Green Transportation	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
A-4 Green Transportation (3 points)	A-4 Green Transportation (2 points)	<ul style="list-style-type: none"> The number of points available has been reduced from 3 points down to 2 points. Strategy C: Private Buses in LOTUS NR V2.0 has been removed Requirements on collective transportation information for occupants from A-PR-2 in LOTUS NR V2.0 are now required to achieve 1 point in Strategy B: Public Transportation.
A-5 Local Materials (2 points)	/	<ul style="list-style-type: none"> Credit removed from LOTUS NC. The use of local materials is now encouraged in Credit M-2 Sustainable Materials.

Community

NR V2.0 Credit/PR	NC V1 Credit/PR	Description of the changes
CY-1 Community Connectivity (2 points)	CY-1 Community Connectivity (1 point)	<ul style="list-style-type: none"> The number of points available has been reduced from 2 points down to 1 point The following exception is included in the requirements: Exception: Due to their location in industrial parks, if bicycles are made available for at least 5% of the staff to use (5 bicycles for each 100 staff), factories are allowed to consider a 1km walking distance from the building to the basic services.
CY-2 Public Space (2 points)	CY-2 Outdoor Communal Space and Facilities (2 points)	<ul style="list-style-type: none"> Public spaces should bring some social and recreational value to be compliant.
CY-3 Access for People with Disabilities (2 points)	/	<ul style="list-style-type: none"> Credit removed from LOTUS NC.
/	CY-3 Community Awareness (2 points)	<ul style="list-style-type: none"> New credit aiming to promote awareness and knowledge about sustainability issues in the community

Management

NR V2.0 Credit/PR	NC V1 Credit/PR	Description of the changes
Man-PR-1 Design Stage	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
Man-1 Design Stage (1 point)	Man-1 Integrated Design Process (1 point)	<ul style="list-style-type: none"> The credit has been renamed “Integrated Design Process” Requirements have been changed from involving a LOTUS AP to following an integrated design process
Man-PR-2 Construction Stage	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
Man-2 Construction Stage (2 points)	Man-2 Construction Stage (1 point)	<ul style="list-style-type: none"> The number of points available has been reduced from 2 points down to 1 point.
Man-3 Commissioning (4 points)	Man-3 Commissioning (4 points)	<ul style="list-style-type: none"> The credit now includes 3 different steps: <ul style="list-style-type: none"> For 2 points, the project should conduct commissioning activities to ensure that building systems are well-installed and are performing as intended For 3 points, the project should also ensure a proper handover to the owner O&M staff and end users For 4 points, the project should also conduct commissioning activities during the operations of the building The list of systems to be commissioned, “Hydraulic systems” has been replaced with: “Plumbing systems (including the domestic hot water systems and pumping systems)”
Man-PR-3 Maintenance	Man-PR-3 Maintenance	<ul style="list-style-type: none"> No changes
Man-4 Maintenance (2 points)	Man-4 Maintenance (2 points)	<ul style="list-style-type: none"> No changes
Man-PR-4 Green Management	Man-PR-4 Green Management	<ul style="list-style-type: none"> No changes
Man-5 Green Management (1 point)	Man-5 Green Management (1 point)	<ul style="list-style-type: none"> No changes

Innovation

NR V2.0 Credit/PR	NC V1 Credit/PR	Description of the changes
Inn-1 Exceptional Performance Enhancement	Inn-1 Exceptional Performance Enhancement	<ul style="list-style-type: none"> ▪ Exceptional Performance Enhancement points can be awarded in a new situation: when, in a credit with different strategies available, the building performance reaches a higher number of points than what is available in the credit.
Inn-2 Innovative techniques / initiatives	Inn-2 Innovative techniques / initiatives	<ul style="list-style-type: none"> ▪ Previous criterion has been replaced with: "Implement innovative techniques/initiatives that are outside the scope of LOTUS"

2.4 Changes in the glossary

The following modifications have been brought to the Glossary:

- The Glossary has been reorganized under different sections:
 - LOTUS specific terms
 - Submissions terms
 - Master Plan terms
 - Technical Terms

- The following definitions have been updated:
 - Gross Floor Area (GFA)
 - Net occupied area
 - Occupied spaces

- The following definitions have been added:
 - Conditioned space
 - CPSF (Cooling Performance Seasonal Factor)
 - Full-time occupants
 - LPD (Lighting Power Density)
 - SRI (Solar Reflectance Index)
 - SHGC (Solar Heat Gain Coefficient)
 - VAV (variable air volume)
 - VRV/VRF (variable refrigerant volume/flow)
 - VSD (variable-speed drive)

3. List of changes from LOTUS MFR Pilot

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Credits	<ul style="list-style-type: none"> ▪ The following credits have been removed from LOTUS MFR Pilot: <ul style="list-style-type: none"> - M-1 Materials Reuse - M-2 Materials with Recycled Content - M-4 Sustainable Timber and Rapidly Renewable Materials - Eco-1 Construction Environmental Management Plan - A-5 Local Materials ▪ The following credits have been added in LOTUS NC V1: <ul style="list-style-type: none"> - M-1 Reduced Concrete Use - M-2 Sustainable Materials - WP-5 Construction Activity Pollution Control ▪ Man-6 Green Awareness has been moved to Community Category and is now named: CY-3 Community Awareness

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E-PR-3 Total Building Energy Use	E-PR-3 Total Building Energy Use	<ul style="list-style-type: none"> LOTUS Guidelines – Energy Performance Calculation Method have been updated in line with QCVN 09:2017/BXD
E-1 Total Building Energy Use (14 points)	E-1 Total Building Energy Use (14 points)	
E-2 Building Envelope (4 points)	E-2 Building Envelope (3 points)	<ul style="list-style-type: none"> The number of points available has been reduced from 4 points down to 3 points. In Option A, points are now awarded for every 15% reduction of building’s average OTTV compared to QCVN 09:2017/BXD requirements Requirements in Option B have been split in 4 strategies for more clarity: <ul style="list-style-type: none"> Strategy B1: Solar radiation Strategy B2: West facing façade Strategy B3: WWR on West and East facing facades Strategy B4: Effective external shadings Projects with no west-facing façade and no east-facing façade are directly awarded 2 points in Strategy B2 and Strategy B3 is not applicable.

E-3 Natural Ventilation and Air-conditioning (6 points)	E-3 Building Cooling (6 points)	<ul style="list-style-type: none"> ▪ The credit has been renamed “Building Cooling” ▪ Strategy B: Air-conditioning <ul style="list-style-type: none"> - In line with QCVN 09:2017/BXD where efficiency of non-ducted air-conditioners is assessed against CSPF instead of COP, the following changes have been made: <ul style="list-style-type: none"> • one new requirement has been added: 1 point for every 20% improvement of CSPF for non-ducted air-conditioners with a cooling capacity under 12 kW • a new table with minimum CSPF requirements has been added. • a new formula has been added to calculate the percentage of CSPF Improvement - Tables including minimum COP requirements have been updated according to QCVN 09:2017/BXD and ASHRAE 90.1-2013. - VAV systems now need to be high-performance VAV systems to comply with Strategy B2
E-4 Artificial Lighting (3 points)	E-4 Artificial Lighting (3 points)	<ul style="list-style-type: none"> ▪ No changes as the LPD value required for residential buildings in QCVN 09:2017/BXD is the same as the value required in QCVN 09:2013/BXD.
E-5 Energy Monitors (1 point)	E-5 Energy Monitoring and Management (1 point)	<ul style="list-style-type: none"> ▪ If a centralized air-conditioning system is used to provide cooling to the dwelling units, energy meters should be installed to monitor the energy consumption for cooling.
E-6 Lifts (1 point)	E-6 Lifts (1 point)	<ul style="list-style-type: none"> ▪ No changes
E-7 Renewable Energy (2 points)	E-7 Renewable Energy (2 points)	<ul style="list-style-type: none"> ▪ No changes

Water

MFR Pilot Credit/PR	NC V1 Credit/PR	Description of the changes
W-PR-1 Water Efficient Fixtures	W-PR-1 Water Efficient Fixtures	<ul style="list-style-type: none"> Requirements for the prerequisite have been raised to a minimum of 20% reduction of total building domestic water consumption through fixtures in comparison to baseline.
W-1 Water Efficient Fixtures (5 points)	W-1 Water Efficient Fixtures (5 points)	<ul style="list-style-type: none"> Requirements for points have all been raised by 5% of reduction of total building domestic water consumption through fixtures in comparison to baseline. Kitchen faucets used exclusively for filling operations should not be considered Flow rates for faucets and showerheads should either be based on pressure of 3 bars or on actual flow rates measured on-site In case faucets with auto control are installed in the building, the baseline water use should be calculated with a 15 seconds duration of use and the design water use should be calculated with a 12 seconds duration of use.
W-2 Water Efficient Landscaping (2 points)	W-2 Water Efficient Landscaping (2 points)	<ul style="list-style-type: none"> The quality of the water used for irrigation should meet the requirements of QCVN 39:2011/BTNMT National technical regulation on Water Quality for irrigated agriculture.
W-3 Water Monitoring (2 points)	W-3 Water Metering (1 point)	<ul style="list-style-type: none"> The credit has been renamed “Water Metering” The list of major water flows to monitor with permanent water meters (as applicable to the projects) is now provided Residential projects need to meter water flows in common areas only. Water consumption in the dwelling-units doesn't have to be monitored
W-4 Sustainable Water Use Solutions (4 points)	W-4 Sustainable Water Use Solutions (5 points)	<ul style="list-style-type: none"> The number of points available has been increased from 4 points up to 5 points. 3 strategies are now included: <ul style="list-style-type: none"> Strategy A: Water recycling/reuse/harvest Strategy B: Swimming Pool Water Efficiency Strategy C: Cooling Tower Water Efficiency For strategy A: Water recycling/reuse/harvest, a list of standards with minimum quality requirements at the point of delivery for recycled, reused or harvested water is included: <ul style="list-style-type: none"> QCVN 39:2011/BTNMT QCVN 02:2009/BYT NSF/ANSI Standard 350

Materials

MFR Pilot Credit/PR	NC V1 Credit/PR	Description of the changes
M-1 Material Reuse (2 points)	/	<ul style="list-style-type: none"> ▪ Credit removed from LOTUS NC.
M-2 Materials with Recycled Content (3 points)	/	<ul style="list-style-type: none"> ▪ Credit removed from LOTUS NC.
/	M-1 Reduced Concrete Use (2 points)	<ul style="list-style-type: none"> ▪ New credit to encourage projects to minimize the use of concrete in buildings. ▪ 3 strategies are included: <ul style="list-style-type: none"> - Strategy A: Reduce concrete usage for slabs - Strategy B: Reduce concrete usage for beams and columns - Strategy C: Reduce concrete usage for non-structural systems ▪ For compliance, projects should use solutions such as: pre-stressed elements, structural steel, steel-concrete composite materials, drywall partitions, etc.
/	M-2 Sustainable Materials (6 points)	<ul style="list-style-type: none"> ▪ New credit to encourage the use of sustainable materials which include reused materials, materials with recycled content, rapidly renewable materials, sustainable timber and materials third party certified based on whole lifecycle analysis. ▪ Points are based on the percentage of the total value of the materials in the project that is from sustainable materials ▪ The different types of sustainable materials are given different “weights” (referred to as “sustainability value”) to consider in calculations ▪ Also, additional features to the sustainable materials (such as: materials manufactured in an ISO 14001 certified facility, environmental product declarations, local materials, etc.) are also considered in calculations through sustainability factors
M-3 Non-baked Materials (2 points)	M-3 Non-baked Materials (2 points)	<ul style="list-style-type: none"> ▪ In line with circular 13/2017/TT-BXD, thresholds have been raised from 50% and 70% to 80% and 100% for 1 and 2 points. ▪ Calculations can now be based either on area (m²) or on volume (m³) ▪ Column cladding should be included in the calculations but glass and laminate partitions should be excluded
M-4 Sustainable Timber and Rapidly Renewable Materials (2 points)	/	<ul style="list-style-type: none"> ▪ The credit has been removed from LOTUS NC.

Ecology

MFR Pilot Credit/PR	NC V1 Credit/PR	Description of the changes
Eco-PR-1 Environment	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
Eco-1 Construction Environmental Management Plan (2 points)	/	<ul style="list-style-type: none"> Credit removed from LOTUS NC.
Eco-2 Habitat Restoration (3 points)	Eco-1 Habitat Restoration (2 points)	<ul style="list-style-type: none"> The number of points available has been reduced from 3 points down to 2 points. A new exception has been added: For schools, turf grass areas designated for sports uses may be excluded from the calculations. The area of turf grass should then be deducted from the site area As.
Eco-3 Development footprint (2 points)	Eco-2 Development footprint (2 points)	<ul style="list-style-type: none"> Another strategy can be followed to increase the open space of the project, which is to make the roof accessible to occupants. Will qualify as open space, the area of the roof that is accessible to all occupants and that is vegetated or provides social / recreational value (seating, swimming pool, playground, etc.) A calculation section is now included.
Eco-4 Green Roof (2 points)	Eco-3 Green Roof (2 points)	<ul style="list-style-type: none"> Thresholds have been decreased to 20% and 40% of green roof area for 1 and 2 points. Clearer descriptions are given for extensive, semi-intensive and intensive green roofs. Calculation method has been updated: <ul style="list-style-type: none"> Area of the roof covered with solar PV systems and solar water heating systems should be deducted from the entire roof area in the calculations. Semi-intensive and intensive green roofs are now considered together in calculations

Waste & Pollution

MFR Pilot Credit/PR	NC V1 Credit/PR	Description of the changes
WP-PR-1 Wastewater Treatment	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
WP-1 Refrigerants (1 point)	WP-1 Refrigerants (1 point)	<ul style="list-style-type: none"> No changes
WP-PR-3 Demolition and Construction Waste	WP-PR-1 Demolition and Construction Waste	<ul style="list-style-type: none"> No changes
WP-2 Demolition and Construction Waste (2 points)	WP-2 Demolition and Construction Waste (2 points)	<ul style="list-style-type: none"> No changes
WP-3 Waste Management (3 points)	WP-3 Operation Waste Management (2 point)	<ul style="list-style-type: none"> The credit has been renamed "Operation Waste Management" The number of points available has been reduced from 3 points down to 2 points. Strategy B1: Management and sorting of recyclables <ul style="list-style-type: none"> Storage place in dwelling-units is not required anymore The size of the storage area should not be calculated based on the total gross floor area but should be based on the number of residents and frequency of recycling pick-up. Strategy B2: Management and sorting of organic wastes <ul style="list-style-type: none"> Storage place in dwelling-units is not required anymore Projects can hire a company to compost the organic wastes Strategy B3: Management and sorting of bulky wastes has been removed but it is still required to provide a space sufficiently sized for bulky wastes (considering the intended frequency of collection) in the common waste storage area.
WP-PR-4 Light Pollution Minimization	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
WP-4 Light Pollution Minimization (1 point)	WP-4 Light Pollution Minimization (1 point)	<ul style="list-style-type: none"> Requirements on automatic lighting shutoff strategies from WP-PR-4 in LOTUS MFR Pilot are now required to achieve 1 point.
/	WP-5 Construction Activity Pollution Control (1 point)	<ul style="list-style-type: none"> New credit aiming to limit pollution arising from construction activities Measures should be implemented for erosion, sediment, dust and pollutant control.

Health & Comfort

MFR Pilot Credit/PR	NC V1 Credit/PR	Description of the changes
H-PR-1 Indoor Smoking	H-PR-1 Indoor Smoking	<ul style="list-style-type: none"> Outdoor designated smoking areas should be indicated with signs and should be equipped with ashtrays, trash bins and with extinguishers if located near flammable materials.
H-1 Fresh Air Supply (2 points)	H-1 Fresh Air Supply (2 points)	<ul style="list-style-type: none"> No changes
H-2 Ventilation in Wet Areas (2 points)	H-3 Ventilation in Wet Areas (1 point)	<ul style="list-style-type: none"> No changes
H-3 Hazardous Materials (3 points)	H-4 Low Emission Products (3 points)	<ul style="list-style-type: none"> The credit has been renamed Low Emission Products and is now split in 5 strategies: <ul style="list-style-type: none"> - Strategy A: Paints and coatings - Strategy B: Adhesives and sealants - Strategy C: Floorings - Strategy D: Composite wood - Strategy E: Ceilings, partitions and insulation Criteria to define which products are considered as low-VOC and as low-formaldehyde have been broadened.
H-4 Daylighting (3 points)	H-5 Daylighting (3 points)	<ul style="list-style-type: none"> Spaces that are not compatible with the provision of daylighting (such as: auditoriums and conference rooms dedicated to video conferencing) can be exempted from this credit.
H-5 Thermal Comfort (2 points)	H-7 Thermal Comfort (2 points)	<ul style="list-style-type: none"> Air-conditioned spaces and mixed-mode ventilated spaces: Consistent indoor conditions to maintain should be a dry-bulb temperature set between 24° to 26°C (instead of an operative temperature set between 24° to 26°C and a relative humidity set below 70% as required in LOTUS MFR Pilot) Non-air-conditioned spaces: Installation of high-volume low-speed (HVLS) fans is included as a strategy to increase indoor air velocity in method 2 of compliance for non-air-conditioned spaces
H-6 Noise Insulation (1 point)	H-8 Noise Insulation (1 point)	<ul style="list-style-type: none"> No changes

Adaptation & Mitigation

MFR Pilot Credit/PR	NC V1 Credit/PR	Description of the changes
A-PR-1 Flooding Resistance	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
A-1 Flooding Resistance (1 point)	A-1 Flooding Resistance (1 point)	<ul style="list-style-type: none"> Requirements on flood risk report from A-PR-1 in LOTUS MFR Pilot are now required to achieve 1 point in the credit.
A-2 Storm Water Runoff (2 points)	A-2 Stormwater Management (2 points)	<ul style="list-style-type: none"> The credit has been renamed “Stormwater Management” The credit has been split in 2 options: <ul style="list-style-type: none"> Option A: Site Perviousness Option B: Stormwater Control Option A is the same as in MFR Pilot but is only applicable to projects that have a non-building area + green roof area that makes up more than 20% of the total site area or makes up more than 200 m² Option B requires projects to use stormwater control practices to help capture and/or infiltrate stormwater in order to decrease volume of on-site stormwater runoff from the 2-year storm event.
A-3 Heat Island Effect (2 points)	A-3 Heat Island Effect (2 points)	<ul style="list-style-type: none"> In calculations, areas covered with skylights should be deducted from the roof area.
A-PR-2 Green Transportation	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
A-4 Green Transportation (3 points)	A-4 Green Transportation (2 points)	<ul style="list-style-type: none"> The number of points available has been reduced from 3 points down to 2 points. Strategy C: Private Buses in LOTUS MFR Pilot has been removed Requirements on collective transportation information for occupants from A-PR-2 in LOTUS MFR Pilot are now required to achieve 1 point in Strategy B: Public Transportation.
A-5 Local Materials (2 points)	/	<ul style="list-style-type: none"> Credit removed from LOTUS NC. The use of local materials is now encouraged in Credit M-2 Sustainable Materials.

Community

MFR Pilot Credit/PR	NC V1 Credit/PR	Description of the changes
CY-PR-1 Access for People with Disabilities	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
CY-1 Community Connectivity (2 points)	CY-1 Community Connectivity (1 point)	<ul style="list-style-type: none"> The number of points available has been reduced from 2 points down to 1 point.
CY-2 Public Space (2 points)	CY-2 Outdoor Communal Space and Facilities (2 points)	<ul style="list-style-type: none"> New Credit CY-2 Public space is merging previous credits CY-2 Public Space and CY-3 Outdoor Communal Facilities and includes them as 2 different strategies: <ul style="list-style-type: none"> Strategy A: Public space Strategy B: Outdoor Communal Facilities In Strategy A, public spaces should have social and recreational value to be compliant.
CY-3 Outdoor Communal Facilities (2 points)		
/	CY-3 Community Awareness (2 points)	<ul style="list-style-type: none"> New credit aiming to promote awareness and knowledge about sustainability issues in the community

Management

MFR Pilot Credit/PR	NC V1 Credit/PR	Description of the changes
Man-PR-1 Design Stage	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
Man-1 Design Stage (1 point)	Man-1 Integrated Design Process (1 point)	<ul style="list-style-type: none"> The credit has been renamed “Integrated Design Process” Requirements have been changed from involving a LOTUS AP to following an integrated design process
Man-PR-2 Construction Stage	/	<ul style="list-style-type: none"> Prerequisite removed from LOTUS NC.
Man-2 Construction Stage (2 points)	Man-2 Construction Stage (1 point)	<ul style="list-style-type: none"> The number of points available has been reduced from 2 points down to 1 point.
Man-3 Commissioning (4 points)	Man-3 Commissioning (4 points)	<ul style="list-style-type: none"> The credit now includes 3 different steps: <ul style="list-style-type: none"> For 2 points, the project should conduct commissioning activities to ensure that building systems are well-installed and are performing as intended For 3 points, the project should also ensure a proper handover to the owner O&M staff and end users For 4 points, the project should also conduct commissioning activities during the operations of the building The list of systems to be commissioned, “Hydraulic systems” has been replaced with: “Plumbing systems (including the domestic hot water systems and pumping systems)”
Man-PR-3 Maintenance	Man-PR-3 Maintenance	<ul style="list-style-type: none"> No changes
Man-4 Maintenance (2 points)	Man-4 Maintenance (2 points)	<ul style="list-style-type: none"> No changes
Man-PR-4 Green Management	Man-PR-4 Green Management	<ul style="list-style-type: none"> No changes
Man-5 Green Management (1 point)	Man-5 Green Management (1 point)	<ul style="list-style-type: none"> No changes
Man-6 Green Awareness (2 points)	/	<ul style="list-style-type: none"> Credit moved to the Community Category and renamed as “Community Awareness”.

Innovation

MFR Pilot Credit/PR	NC V1 Credit/PR	Description of the changes
Inn-1 Exceptional Performance Enhancement	Inn-1 Exceptional Performance Enhancement	<ul style="list-style-type: none"> ▪ Exceptional Performance Enhancement points can be awarded in a new situation: when, in a credit with different strategies available, the building performance reaches a higher number of points than what is available in the credit.
Inn-2 Innovative techniques / initiatives	Inn-2 Innovative techniques / initiatives	<ul style="list-style-type: none"> ▪ Previous criterion has been replaced with: "Implement innovative techniques/initiatives that are outside the scope of LOTUS"

3.4 Changes in the glossary

The following modifications have been brought to the Glossary:

- The Glossary has been reorganized under different sections:
 - LOTUS specific terms
 - Submissions terms
 - Master Plan terms
 - Technical Terms
- The following definitions have been updated:
 - Gross Floor Area (GFA)
 - Net occupied area
 - Occupied spaces
- The following definitions have been added:
 - Conditioned space
 - CPSF (Cooling Performance Seasonal Factor)
 - Full-time occupants
 - LPD (Lighting Power Density)
 - SRI (Solar Reflectance Index)
 - SHGC (Solar Heat Gain Coefficient)
 - VAV (variable air volume)
 - VRV/VRF (variable refrigerant volume/flow)
 - VSD (variable-speed drive)