

Green Roof Projects Funded by the Environment and Conservation Fund



Environment and Conservation Fund Secretariat
June 2016

Environment and Conservation Fund

- ECF - a statutory trust fund set up by the Government of HKSAR.
- Funding support for environmental education, research, technology demonstration, waste reduction and recovery projects.
- Demonstration projects to install environmental facilities for educational purpose, e.g. green roof, renewable energy items, food waste composter, etc.



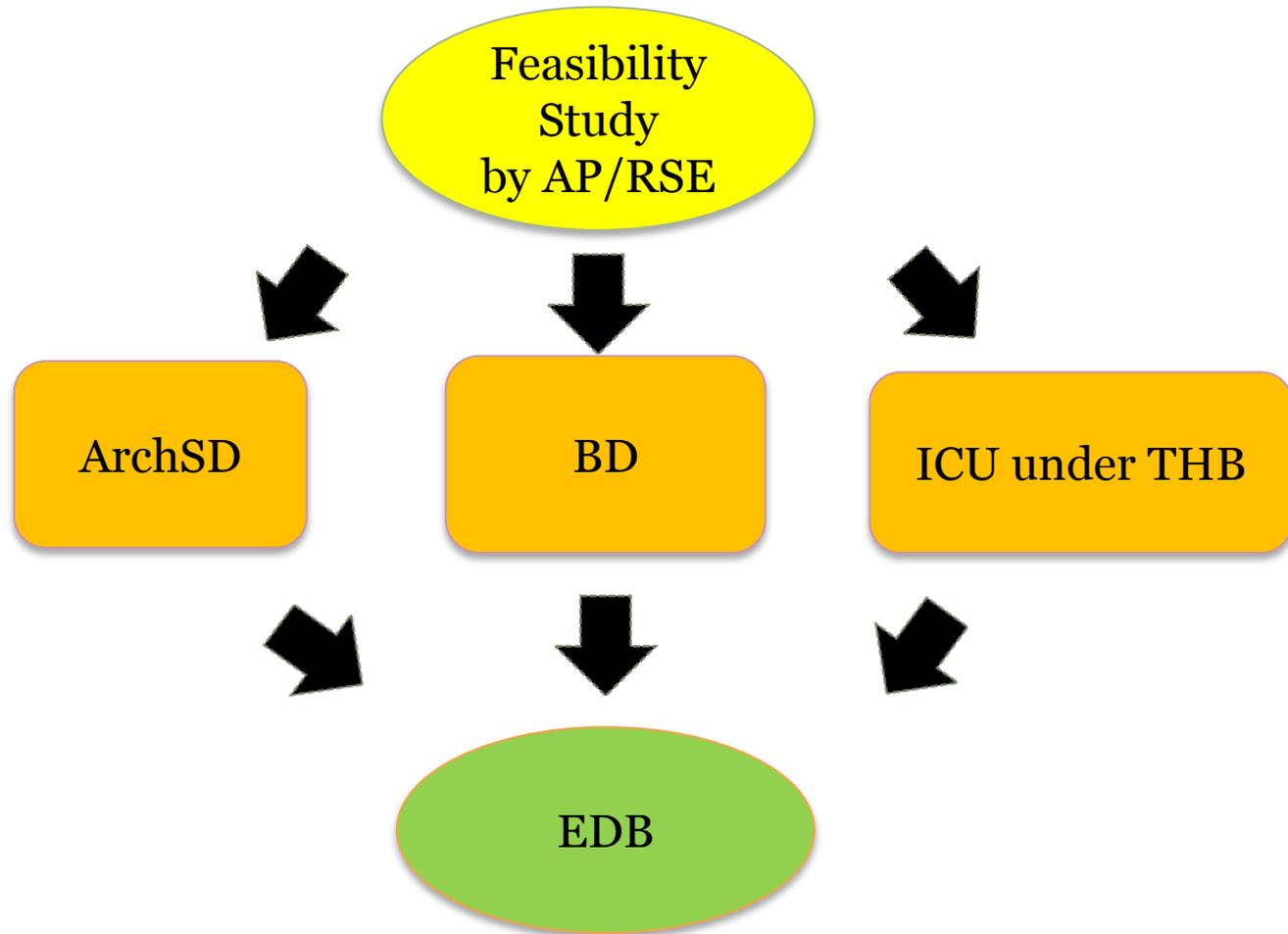
Green Roofs Projects Funded by ECF

- No. of Green Roof projects approved : 133
 No. involving Schools : 116*
- No. of schools involved in Green Roofs projects : 132*
 - Primary schools : 57
 - Secondary schools : 65
 - Special schools : 10
- Overall, ECF has granted a total of about \$50M for greening facilities in these Green Roof projects.



* Note : one school project may cover more than one school and about 60 schools have completed their green roof works.

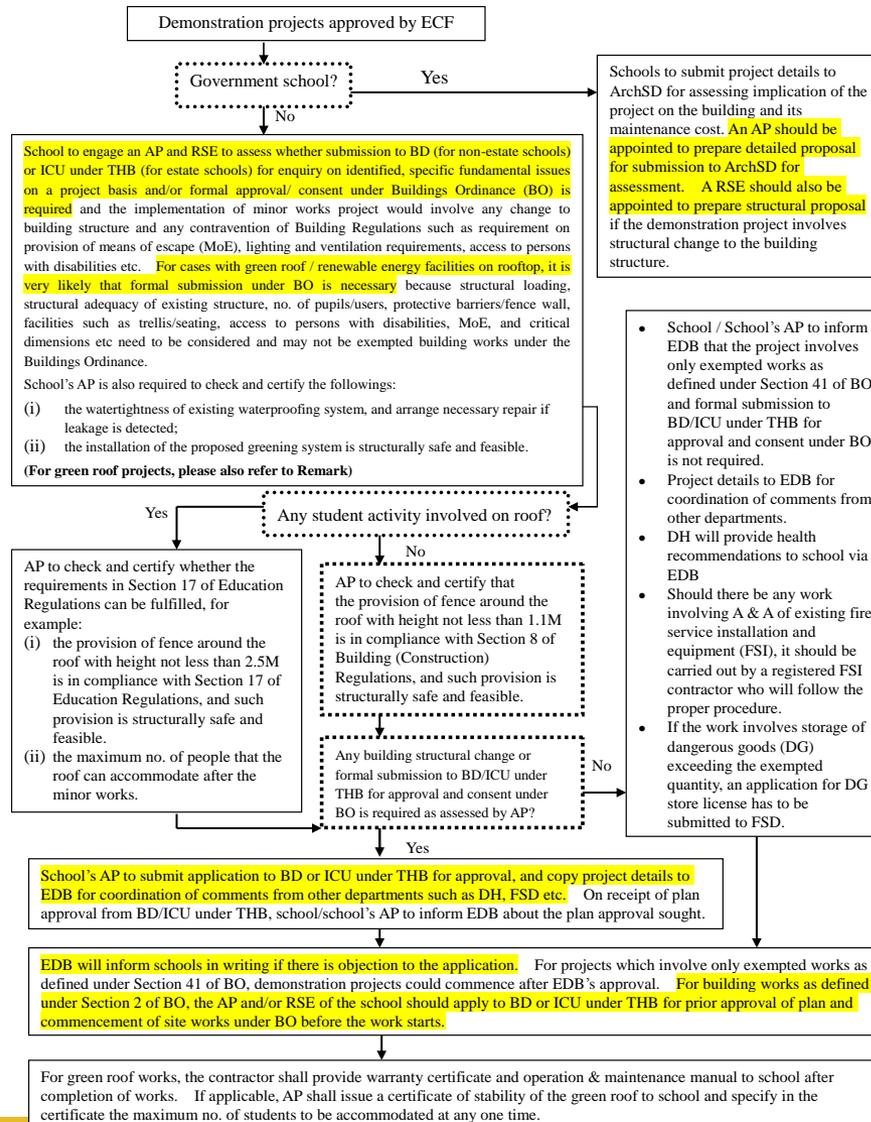
Checking and Assessment Procedure



Assessment Procedure Flowchart

Appendix IA

Flow Chart for Processing Demonstration Projects in Schools



Note : Flowchart is extracted from the Application Form for Demonstration Projects.



Remark Pages

Remark

In planning for the green roof works, schools are requested to draw AP's attention, but not be limited on the following:-

1. Requirements of a roof playground under Section 17 of Education Regulations, extracted as follows:

- (1) Roof playgrounds shall satisfy the following structural requirements-
 - (a) the roof shall be situated on premises constructed of reinforced cement concrete;
 - (b) there shall be a minimum of 2 suitable staircases, leading from the roof to a satisfactory open air exit at ground level, each staircase being of a minimum width of 1.05 m and being fitted with continuous handrails on both sides;
 - (c) at the head of each staircase there shall be landings leading to the roof, each landing being of width equal to the width of the staircase and of a minimum depth of 1.5 m;
 - (d) the external walls surrounding the playground shall be continued upwards so as to form a continuous parapet wall around the playground of a height of not less than 1.1 m. Above such parapet wall there shall be a continuous chain link or similar metal fence fixed to the inner vertical side, or to the innermost edge of the upper surface of the parapet wall. The total height of the parapet wall and the metal fence shall be not less than 2.5 m and the metal fence shall be so installed as to provide ready access to the playground by the Fire Services in emergency. (L.N. 62 of 1977)
- (2) No roof or balcony shall be deemed to be suitable for use as a playground unless a certificate of stability shall have been given by an authorized person that the roof is suitable for such use. Such certificate shall specify the maximum number of pupils who may be allowed to use the playground at any one time. (L.N. 466 of 1993; 27 of 2004 s.37)

2. There are two main categories of green roof:

- Extensive Green Roofs (粗放型綠化屋頂) – They are lightweight, have a narrow plant range, and are geared for low maintenance.
- Intensive Green Roofs (密集型綠化屋頂) – They have deep soils, a wide plant choice such as large trees, shrubs, and require regular garden maintenance.

Owing to smaller structural loading, extensive green roofs are usually adopted for green roof retrofit projects (綠化屋頂翻新工程).

3. A green roof system generally comprises: (i) the root barrier (防根層板), (ii) protection layer (保護層 / moisture retention mat (保濕物料), (iii) drainage layer (排水層), (iv) filter layer (過濾層), (v) growing medium (種植層) (s.a. lightweight soil 輕質泥土 etc.), and (vi) plants (植物); for performing the function of protection of existing waterproofing system of roof against root penetration, discharge of excess water to avoid overloading and flooding, and maintaining appropriate moisture condition for growing plant.

4. All the materials used in the green roof system should be fire resistant and free from asbestos.

5. Any necessary modification of the existing proprietary waterproofing system of the roof should be done by the same proprietary roofing contractor for maintaining the existing valid roofing warranty after the completion of modification works.

6. The existing roof drainage shall not be adversely affected by green roof installation and its planting.

7. "Establishment Works 培植工程" shall be provided within minimum 12months Establishment Period (EP) (培植期) after the completion of green roof. The following items of "Establishment Works" are recommended to be included in the green roof contract for facilitating the handover of a healthy green roof to the school.

Maintenance activities	Recommended interval
Drainage inspection	Once per month (minimum 12 times within EP)
Plant health inspection	Once per month (minimum 12 times within EP)
Removal of littering	Once per month (minimum 12 times within EP)
Irrigation	As necessary to maintain moist soil condition to ensure satisfactory establishment
Disease and pest control	Once per 3 months (minimum 4 times within EP)
Weeding	Once per 4 months (minimum 3 times within EP)
Waterproofing inspection *	Once per 12 months (i.e. by the end of EP) Inspection for water penetration through the concrete slab
Fertilizing	Two operations during early Spring and late Summer or as requested by the school to ensure satisfactory establishment.
Replacement planting	As necessary and requested by the school depending on the health condition of growing plant.
Automatic irrigation system	Once per month (minimum 12 times within EP)

* The ceiling slab underneath the green roof will be inspected for any sign of water leakage. When water leakage is discovered, further inspection shall include opening up of portion of built proprietary green roof system of area approximate 2mx2m and subsequent reinstatement of proprietary green roof system, lightweight soil and re-planting and other necessary installation but not limited to root barrier, drainage layer, filter layer, growing medium / lightweight soil. Replanting for disturbed area upon reinstatement of proprietary green roof system will be required and be counted as maintenance activities under 'replacement planting'.

8. At least 24-month warranty period for the design, materials, and workmanship of completed green roof system shall be provided by the green roof contractor. In particular, the green roof system shall remain performing efficient moisture retention, effective draining off excessive water, supplying nutrients for proposed planting species and providing adequate anchorage for plant during the warranty period. Besides, no government subsidies will be provided for the purpose of maintaining the green roof system after the expiry of the warranty period.

9. Irrigation system should be done by a licensed plumber, and electrical installation works of an automatic irrigation system should be carried out by a registered electrician. If irrigation system involves alteration of the existing water supply system, prior approval should be sought from the Water Supplies Department.

10. A maintenance schedule and operation manual shall be provided by the contractor after completion of green roof system.



Sample of AP's Advice (1)

Feasibility Report

(iii) Specialist Contractor for Green Panel and Submission Requirement:

To ensure the integrity of the Green Panel System to be installed at the Premises and the compliance of the system to the specification, the Green Panel System shall be installed by a specialist contractor having the proven job reference for both Housing Department and Architectural Services Department for the consideration of the Client or its designated agent. A copy of the specification for Housing Department is enclosed in Appendix B for easy reference. The Specialist Contractor shall, together with the tender document, a job reference of their completed projects and one complete set of test reports showing the compliance of all the components in their system to the proposed specification as listed above.

8. Structural feasibility study (Please refer to Appendix C)

Since the installation of new green panel involved structural addition and alteration work and it is not an exempted work under the Buildings Ordinance, approval from the Building Authority must be obtained prior to the commencement of works.

9. Conclusion:

Based on the intensive feasibility study as presented in this Report, the Proposal for Installing a Green Roof and Green Panel System at the rooftop of [REDACTED] is technical viable, structurally safe and feasible based on the assumptions made in the structural feasibility study. Meanwhile, approval from the Building Authority must be obtained prior to the commencement of works.



Sample of AP's Advice (2)

Dear [REDACTED]

RE : Exempted Works for the Proposed Green Roof of
[REDACTED]

We forward a proposed green roof design for the captioned school, shown in the attached drawing and Feasibility Report prepared by [REDACTED] Registered Structural Engineer (RSE), for construction purpose.

The proposed green roof design does not involve in any structural change of the building. It is considered as exempted works as defined in Section 41 of Building Ordinance (BO) and formal submission to Building Department (BD) is not required.

Yours faithfully,

[REDACTED]
AP(A) [REDACTED]

[REDACTED]
Ltd.

Encl. (green roof drawing and feasibility report by RSE)
C.C. [REDACTED]



Other Points to Note

- Remark pages attached to the application form - checklist on various items when planning for Green Roofs projects, such as routine drainage inspection, waterproof inspection, replacement planting, disease and pest control, etc.
- At least 24-month warranty for green roof shall be provided by contractor.
- Contractor should provide maintenance schedule and operation manual after completion of green roof.
- Recipient organisations are responsible for maintenance and repair of the installed facilities after project completion.



Disbursement Procedure

Stage	Disbursement (\$)
1. Approval given in principle	
2. Upon submission of sufficient quotations for Feasibility Study	<u>First Payment:</u> Feasibility Study fee
3. Upon submission of positively concluded Feasibility Study Report by AP/ RSE and sufficient quotations for plan submission	<u>Second Payment:</u> 50% of Plan Submission fee or \$50,000, whichever is less
4. Upon submission of approval letters from EDB and ArchSD/ BD/ ICU of THB , approved plan and sufficient quotations for works items. Consent from the ECF Secretariat is required before works commencement	<u>Third Payment:</u> About 40% of total expected expenditures of the whole project
5. After endorsement of the Report on Completion of Installation by the ECF Secretariat	<u>Fourth Payment:</u> About 40% of total expected expenditures of the whole project
6. After ECF's endorsement of the Completion Report	<u>Final Payment:</u> Minimum 10% of total expected expenditures of the whole project



Some ECF Green Roof Projects



Some ECF Green Roof Projects



Enquiry

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