

紅外線外牆探測報告 Infrared Survey Test Report on External Façade

香港大坑宏豐臺1號
偉景大廈6期
Stage 6 Grandview Mansions
1 Wang Fung Terrace, Tai Hang, Hong Kong

Survey Element 探測位置	External wall 外牆 (Before Renovation 維修前)
Our Job No. 工程項目編號	E895-5713
Our Order No. 工程指令編號	21022601
Date of Survey 探測日期	2021-03-25
Report No. 報告編號	IR2103617_Stage 6
Date of Report 報告日期	2021-03-25
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1. Introduction 引言

Prima Technical Services Limited was appointed by Esprit Falon Construction Consultant Limited to carry out Infrared Survey at the external wall of the Stage 6 Grandview Mansions, 1 Wang Fung Terrace, Tai Hang, Hong Kong. Objective of the survey is to identify location of possible defects on the external wall before renovation as instructed by the customer. Survey was carried out on 25 March 2021 at 3:00 p.m.

思捷富勤建築顧問有限公司委託卓越技術服務有限公司於香港大坑宏豐臺1號偉景大廈6期進行紅外線探測，是次探測目的是，根據客戶的指示，於維修前，評估該建築物外牆當時的情況，找出可能是缺損的位置。探測於二零二一年三月二十五日下午三時開始進行。

2. Equipment 儀器

The survey was carried out using Infrared Camera of Flir, Model T330.

是次探測使用Flir型號T330的紅外線探測儀。

3. Basic Principle of Infrared Survey 紅外線探測基本原理

Every object that is above absolute zero (-273°C) emits Infrared energy. It is because the molecules and atoms in objects above absolute zero are in rotation and vibration. While they are in rotation and vibration, they emit infrared energy. The higher the temperature of the object the more infrared energy it emits. With the thermal imaging device, the radiation is acquired and presented as visible infrared spectrum. We can therefore analyze the infrared spectrum for the temperature variation over a surface. It is noted that the relatively small objects, such as window fins on the external wall, etc., the shady locations, such as lightwell etc., and infrared images taken at rather sharp angles to the external wall are not favourable to the infrared survey on the building façades.

Façade facing the same direction should normally have the same surface temperature. If there are areas with significant temperature variation, it indicates that there are probably anomalies inside the wall, such as debonding of tiles, existence of cracks or cavity inside concrete, water trapped inside the wall, etc. Further attention is recommended.

所有物質的組成分子或原子轉動或震動時都會放出紅外線能量，能量多寡取決於物質的溫度，溫度越高則發出的紅外線越強。藉紅外線探測儀器，我們可以量度物質發放出來的能量並製成圖譜，經分析後可得知物體表面的溫度。若果受測物的特徵相對整個受測面太細，例如窗楣等、陽光不能到達的位置，如光井等及太窄的拍攝位置角度均會影響其測試結果的準確性。

正常情況下，坐向一樣的外牆牆身溫度應該一樣，如果其中有部份範圍出現不平勻的溫度，顯示該處牆身內可能出現不正常的地方，可以是階磚和牆身分離、石屎內層出現空隙或裂痕、牆身內有積水等。均需要進一步跟進。

4. Survey Method 探測方法

Survey was carried out on 25 March 2021 at 3:00 p.m. The weather was in general fine with the temperature of approximately 23°C and the relative humidity of approximately 69% during the survey. 10 infrared images had been acquired in the survey at the external wall of the Stage 6 Grandview Mansions, 1 Wang Fung Terrace, Tai Hang, Hong Kong. Please refer to Appendix A and B for the individual result and the location of the infrared images obtained.

香港大坑宏豐臺1號偉景大廈6期的外牆探測於二零二一年三月二十五日下午三時開始進行，期間天氣大致晴朗，當時氣溫約為攝氏23度，相對濕度約為69%。是次共攝取了10幅紅外線圖譜，個別探測結果及探測位置請參閱附件甲及乙。

5. Survey Results 探測結果

Infrared survey results indicate that the areas/locations with abnormal temperature are identified and highlighted. The estimated defect and survey area are based on the results. The detailed survey results with the infrared image and corresponding photograph are attached at Appendix B and C.

Classification and Recommendation on Different Types of Possible Defects

- I. General defect (area with temperature variation)
Location of minor defect is recommended to carry out general repair as listed in maintenance scheme or perform regularly checking
- II. Serious defect (area with significant temperature variation)
Location of serious defect is recommended to repair it as soon as possible, even immediate repair.
- III. Other possible defect (unusual area with temperature variation)
Stain, ambient effect (freezer room or machine room, etc.), unidentified heat / cold source or other possible defects could cause significant temperature variation in this location. Further investigation or handling it as Type I Defect is recommended

在紅外線探測結果中，外牆溫度有異的地方，會以不同顏色方格顯示，缺損面積和探測面積是從紅外線結果估計出來，請參閱附件乙和丙的詳細探測結果。

可能缺損位置的分類與建議

- I. 一般性的缺損(一般存在溫度差異的位置) - 這些缺損位置可以在定期維修中修復或進行定期監察
- II. 嚴重性的缺損(存在相對溫度差異較大的位置) - 這些缺損位置應該盡快或立刻進行維修
- III. 其他缺損可能(非一般存在溫度差異的位置) - 這些缺損位置可能是污積、環境因素(如雪房或機房的存在)、其他溫差來源或缺損位置，建議作進一步勘察或當以一般性的缺損處理

The defects and findings are enlisted as follows:

以下是探測結果及缺損數據:

Image 圖譜	Elevation 面向	Floor 樓層	No. of Defect 缺損數量	Defect Area (m ²) 缺損面積	Defect Type 缺損分類
01	West 西面	3-R/F	1	3	I
02	West 西面	1-2/F	---	---	---
03	West 西面	G-1/F	1	1	III
04	West 西面	3-R/F	2	3	I
05	West 西面	1-2/F	2	2	I
06	West 西面	G/F	1	1	III
07	West 西面	3-R/F	2	4	I
08	West 西面	2/F	1	2	I
			1	2	III
09	West 西面	1/F	2	2	I
10	West 西面	G/F	---	---	---

Remarks:

1. All findings reported in this report are estimated on the basis of the infrared images taken during the survey.

註釋:

1. 報告中的數據是基於是次之紅外線結果估計及推算出來。

6. Summary 探測總結

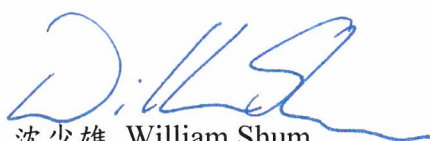
The infrared images obtained at the external wall of the Stage 6 Grandview Mansions, 1 Wang Fung Terrace, Tai Hang, Hong Kong indicate that there were 13 locations with abnormal temperature. These locations could probably be anomalies inside the wall, such as debonding, existence of cracks or cavity inside concrete or water trapped inside the wall, etc. The possible defective areas could be potential problems that require further attention. The total amount of the problem area was approximately 20 m². Please refer to the following summary in detail.

紅外線探測於香港大坑宏豐臺1號偉景大廈6期的外牆共找到13處溫度有異的地方，可能是缺損位置，缺損可以是牆身間之分離、外牆內出現空隙、裂痕或有積水等，建議進一步跟進，總問題位置面積約20平方米。詳細的結果總結現列於下方及可能缺損位置顯示於附件甲。

Elevation 面向	Classification of Defect 缺損分類			Total approx. defective area 總缺損面積約
	I	II	III	
West 西面	10 patches/處 (16 m ²)	---	3 patches/處 (4 m ²)	20 m ²

Please refer to Appendix A for the possible defect locations.

可能缺損位置顯示於附件甲。



沈少雄 William Shum

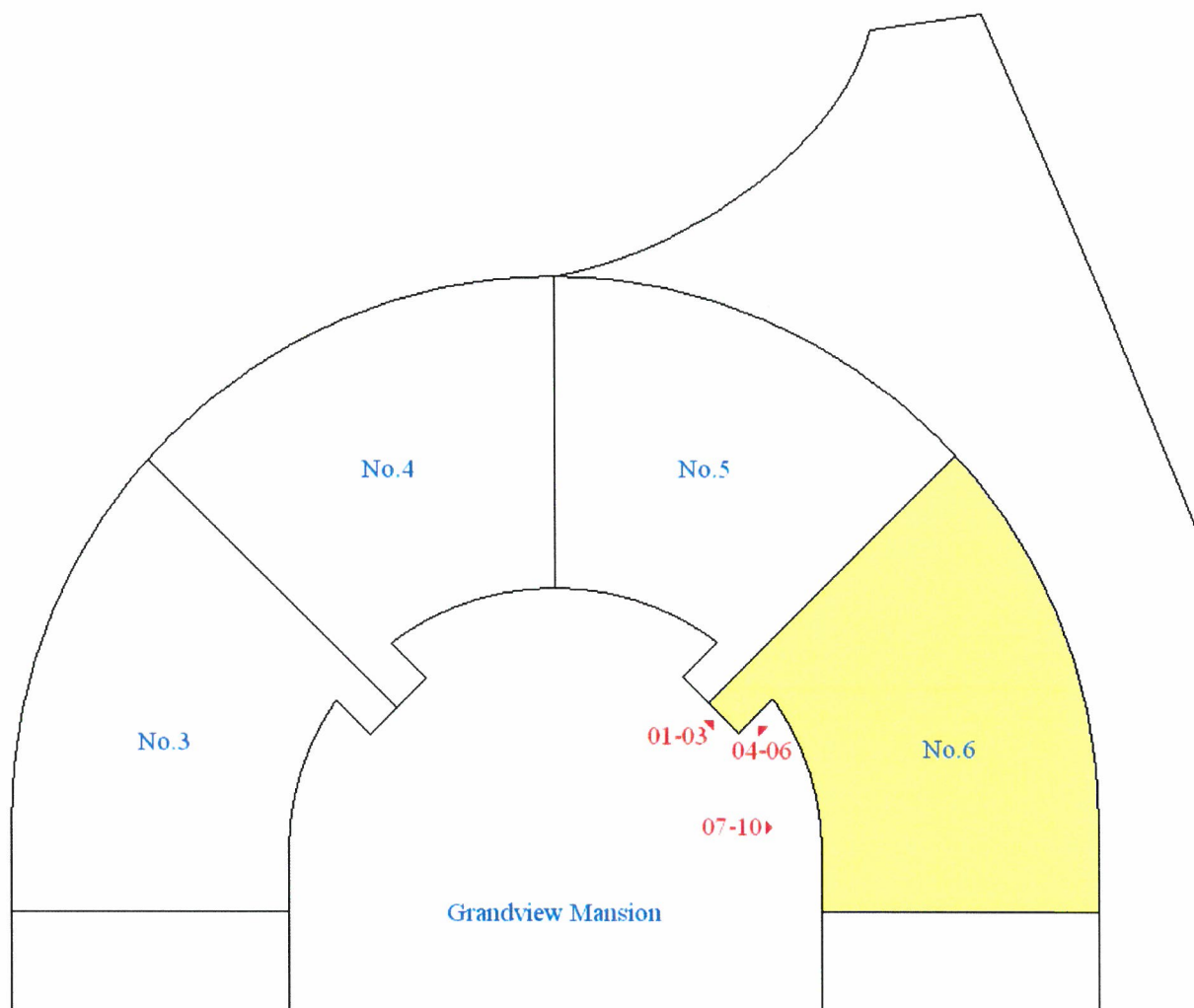
Level II Thermographer

卓越技術服務有限公司

Prima Technical Services Limited

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Appendix A – Infrared Test Location
附件甲—紅外線探測位置



01-10 – Test locations at the external wall
是次於外牆上的探測位置

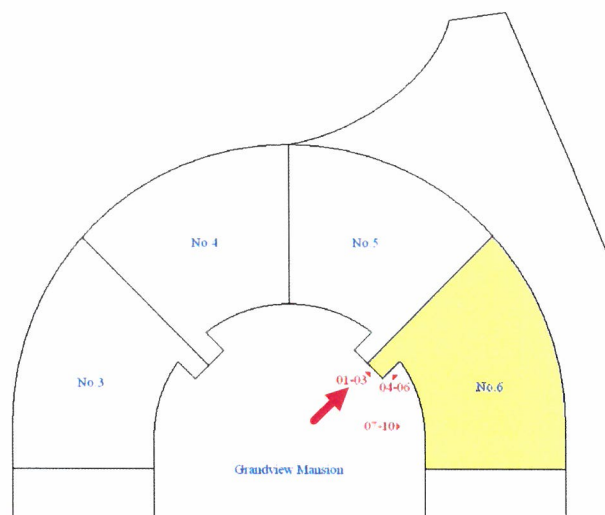
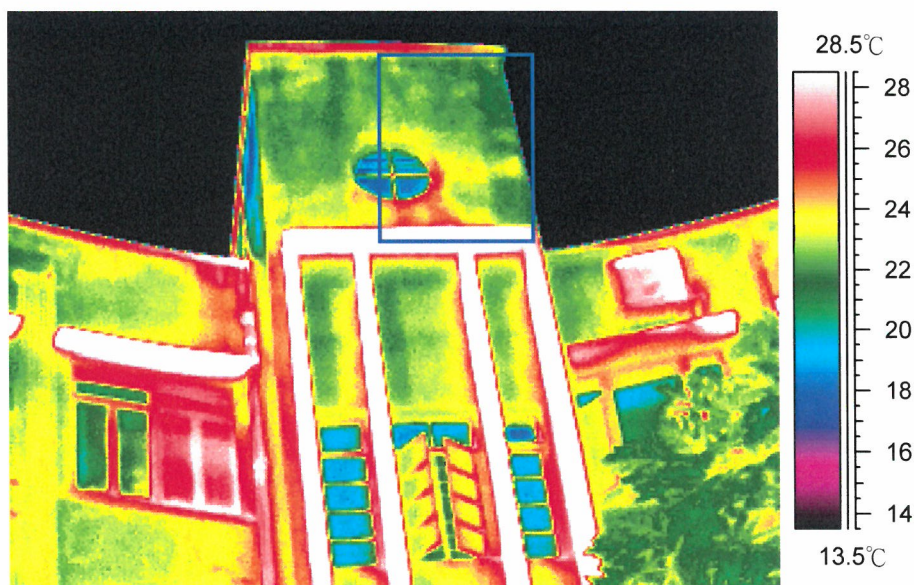
That drawing is not to scale.
此圖不按比例。

香港大坑宏豐臺1號偉景大廈6期平面圖

Appendix B - Infrared Images and Photographic Records

附件乙 - 紅外線圖譜及相片

Image 圖譜: 01
 Location 位置: Stage 6 Grandview Mansion 偉景大廈6期
 Floor 樓層: 3-R/F



Survey Results 探測結果:

Areas with unusual temperature inside boxes in the infrared spectrum are locations of possible defects

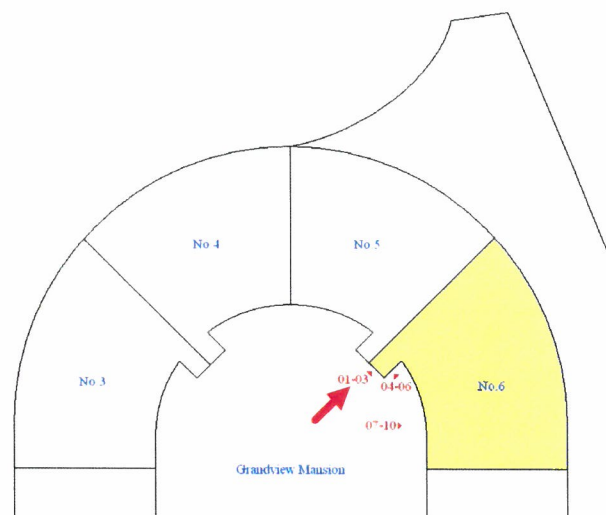
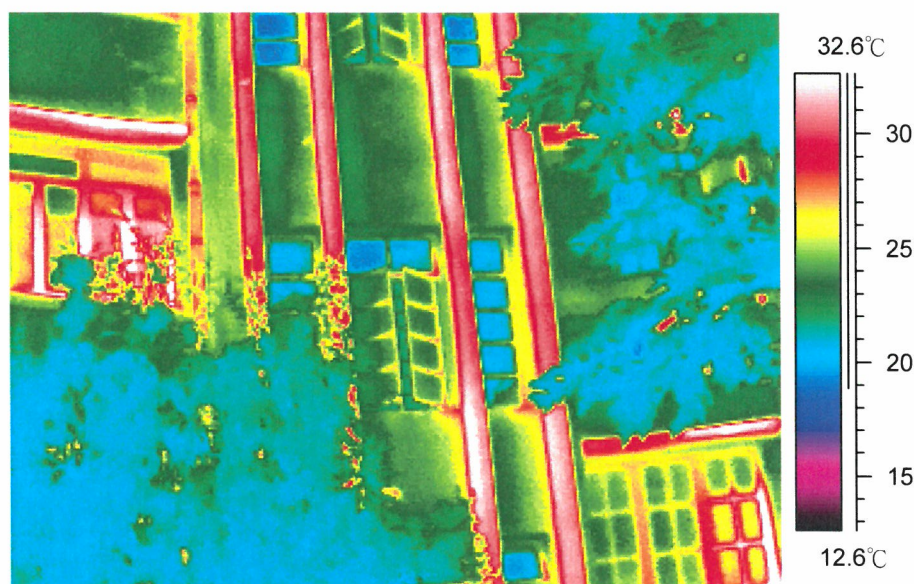
紅外線圖譜中，方格內溫度相對異常的部份是可能缺損的位置。

Classification 分類	Quantity 數量	Estimate Area 估計面積 (m ²)
I (General 一般)	1	3
II (Serious 嚴重)	-	-
III (Other Possible 其他可能)	-	-

Appendix B - Infrared Images and Photographic Records

附件乙 - 紅外線圖譜及相片

Image 圖譜: 02
 Location 位置: Stage 6 Grandview Mansion 偉景大廈6期
 Floor 樓層: 1-2/F



Survey Results 探測結果:

Areas with unusual temperature inside boxes in the infrared spectrum are locations of possible defects

紅外線圖譜中，方格內溫度相對異常的部份是可能缺損的位置。

Classification 分類

I (General 一般)

II (Serious 嚴重)

III (Other Possible 其他可能)

Quantity 數量

-

-

-

Estimate Area 估計面積 (m²)

-

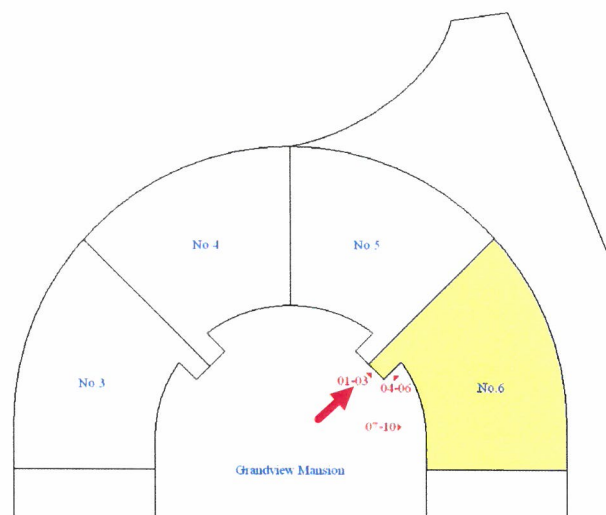
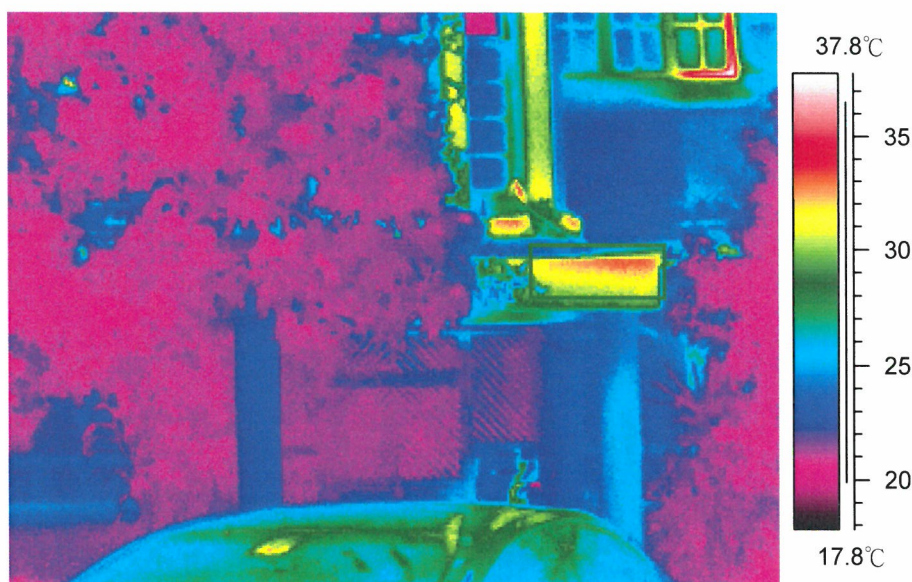
-

-

Appendix B - Infrared Images and Photographic Records

附件乙 - 紅外線圖譜及相片

Image 圖譜: 03
 Location 位置: Stage 6 Grandview Mansion 偉景大廈6期
 Floor 樓層: G-1/F



Survey Results 探測結果:

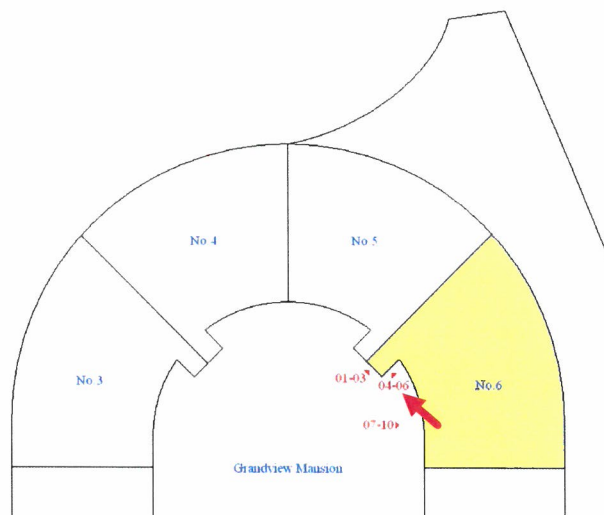
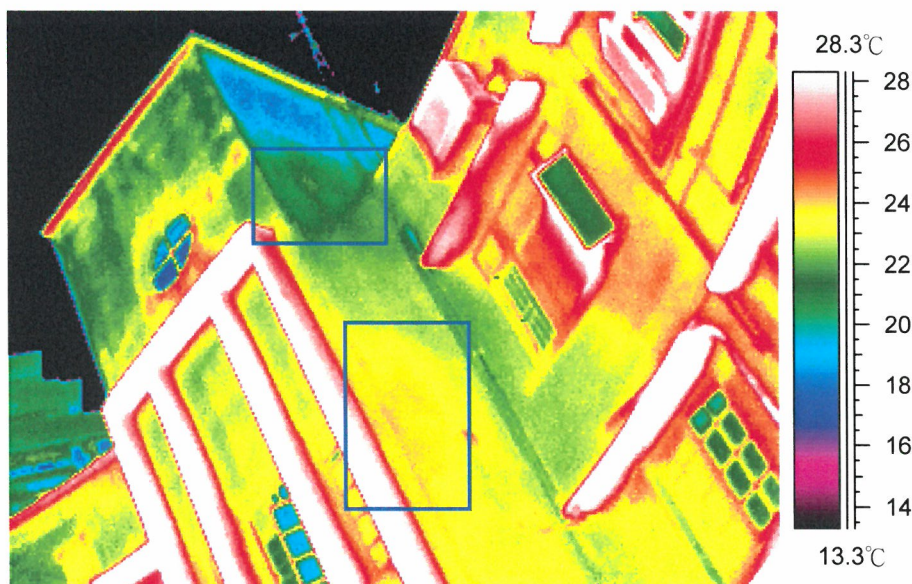
Areas with unusual temperature inside boxes in the infrared spectrum are locations of possible defects

紅外線圖譜中，方格內溫度相對異常的部份是可能缺損的位置。

Classification 分類	Quantity 數量	Estimate Area 估計面積 (m ²)
I (General 一般)	-	-
II (Serious 嚴重)	-	-
III (Other Possible 其他可能)	1	1

Appendix B - Infrared Images and Photographic Records 附件乙 - 紅外線圖譜及相片

Image 圖譜: 04
Location 位置: Stage 6 Grandview Mansion 偉景大廈6期
Floor 樓層: 3-R/F



Survey Results 探測結果:

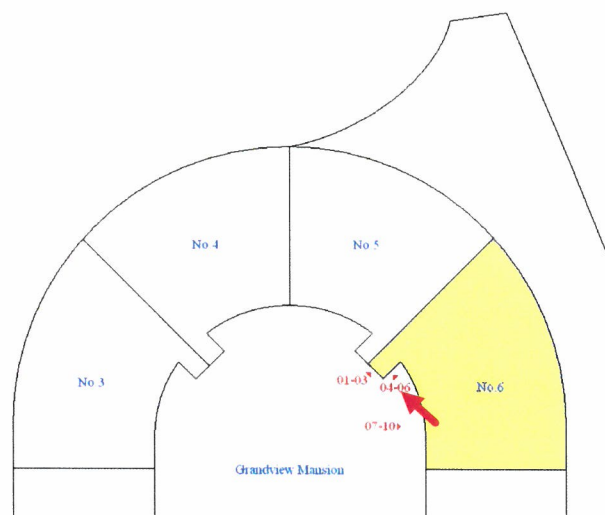
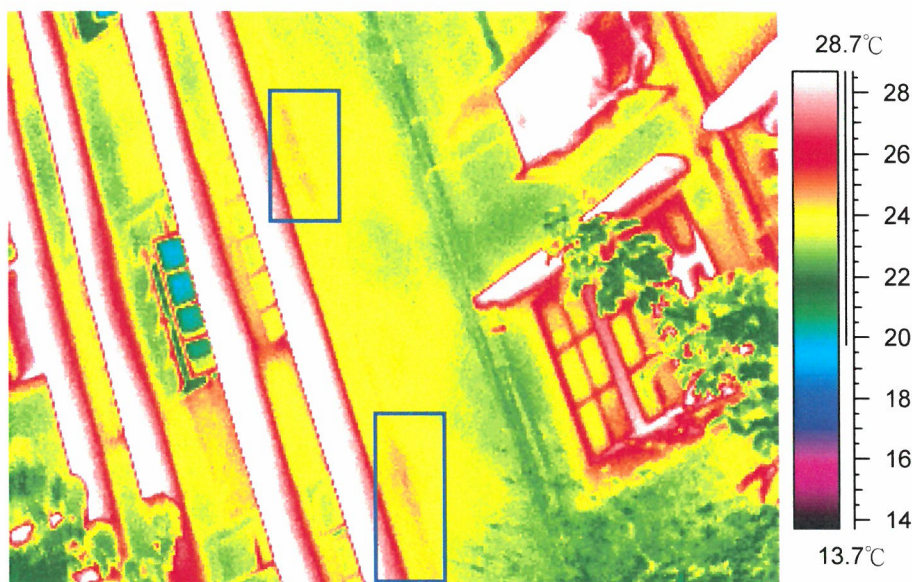
Areas with unusual temperature inside boxes in the infrared spectrum are locations of possible defects
紅外線圖譜中，方格內溫度相對異常的部份是可能缺損的位置。

Classification 分類	Quantity 數量	Estimate Area 估計面積 (m ²)
I (General 一般)	2	3
II (Serious 嚴重)	-	-
III (Other Possible 其他可能)	-	-

Appendix B - Infrared Images and Photographic Records

附件乙 - 紅外線圖譜及相片

Image 圖譜: 05
Location 位置: Stage 6 Grandview Mansion 偉景大廈6期
Floor 樓層: 1-2/F



Survey Results 探測結果:

Areas with unusual temperature inside boxes in the infrared spectrum are locations of possible defects

紅外線圖譜中，方格內溫度相對異常的部份是可能缺損的位置。

Classification 分類

I (General 一般)

II (Serious 嚴重)

III (Other Possible 其他可能)

Quantity 數量

2

-

-

Estimate Area 估計面積 (m²)

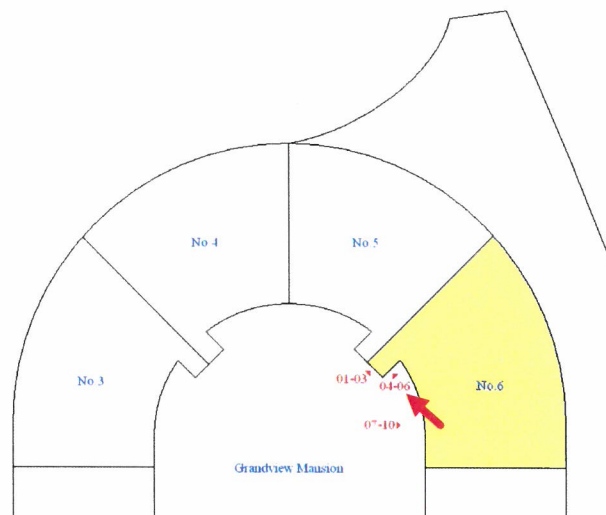
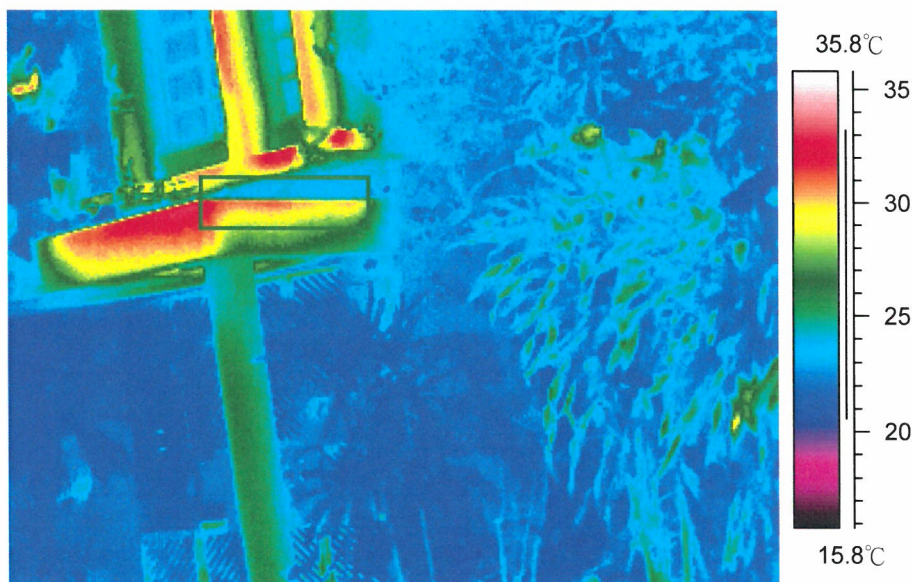
2

-

-

Appendix B - Infrared Images and Photographic Records 附件乙 - 紅外線圖譜及相片

Image 圖譜: 06
Location 位置: Stage 6 Grandview Mansion 偉景大廈6期
Floor 樓層: G/F



Survey Results 探測結果:

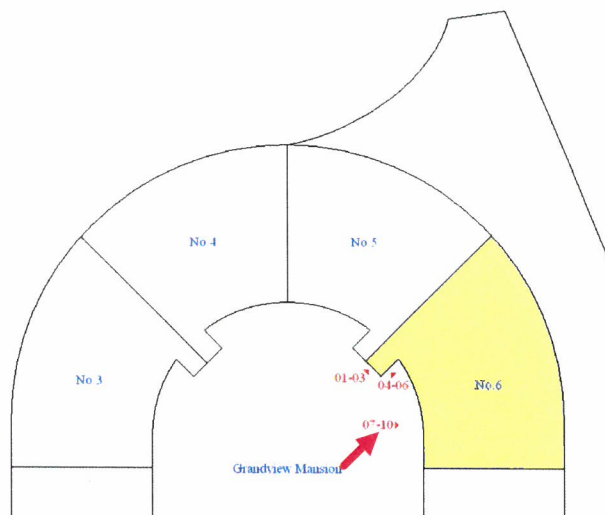
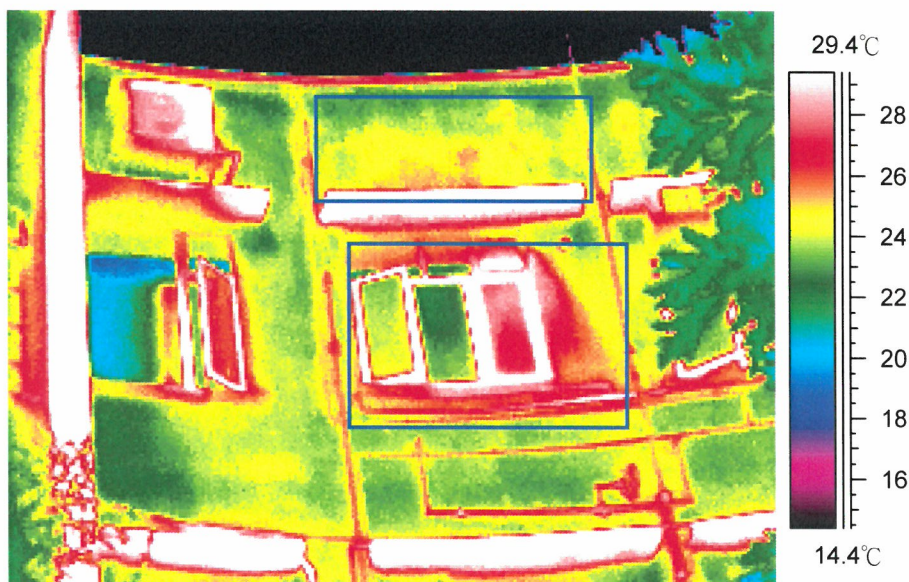
Areas with unusual temperature inside boxes in the infrared spectrum are locations of possible defects
紅外線圖譜中，方格內溫度相對異常的部份是可能缺損的位置。

Classification 分類	Quantity 數量	Estimate Area 估計面積 (m ²)
I (General 一般)	-	-
II (Serious 嚴重)	-	-
III (Other Possible 其他可能)	1	1

Appendix B - Infrared Images and Photographic Records

附件乙 - 紅外線圖譜及相片

Image 圖譜: 07
 Location 位置: Stage 6 Grandview Mansion 偉景大廈6期
 Floor 樓層: 3-R/F



Survey Results 探測結果:

Areas with unusual temperature inside boxes in the infrared spectrum are locations of possible defects

紅外線圖譜中，方格內溫度相對異常的部份是可能缺損的位置。

Classification 分類

I (General 一般)

II (Serious 嚴重)

III (Other Possible 其他可能)

Quantity 數量

2

-

-

Estimate Area 估計面積 (m²)

4

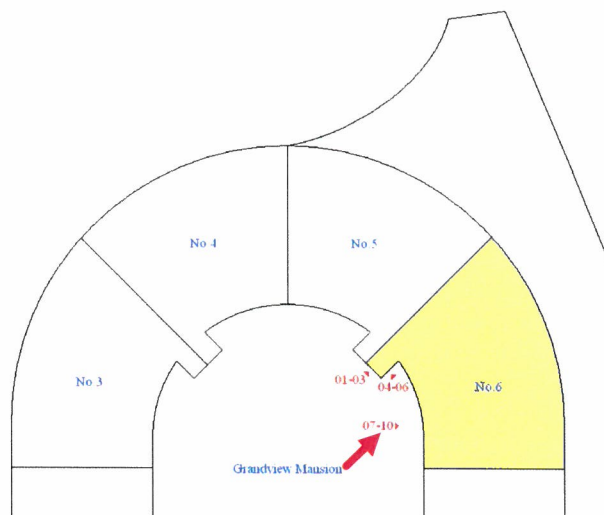
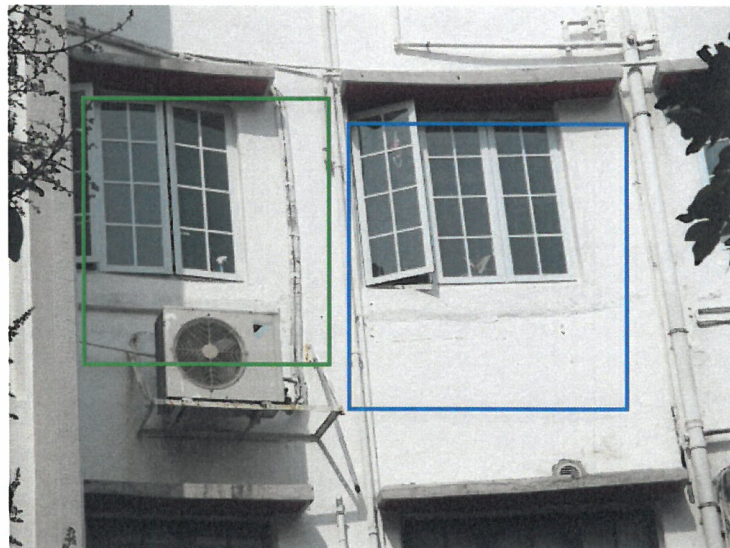
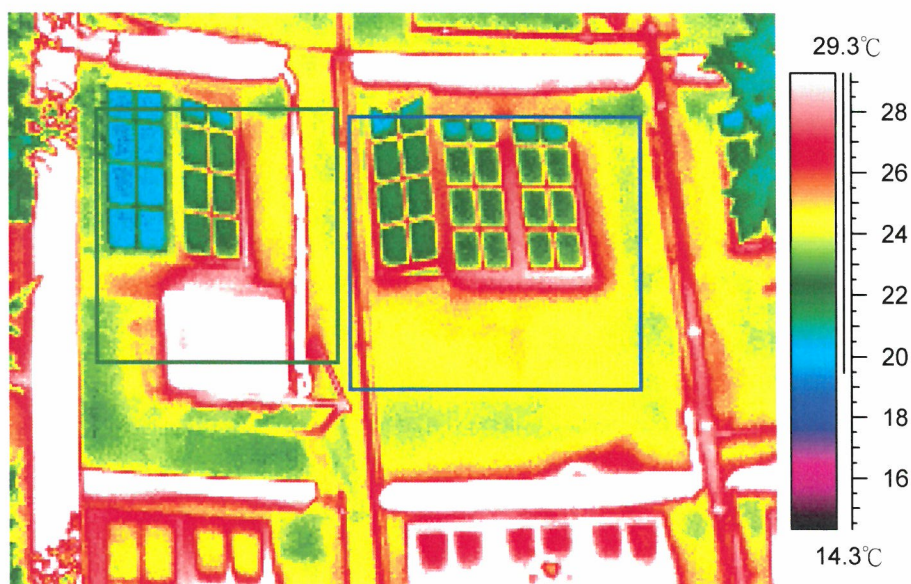
-

-

Appendix B - Infrared Images and Photographic Records

附件乙 - 紅外線圖譜及相片

Image 圖譜: 08
 Location 位置: Stage 6 Grandview Mansion 偉景大廈6期
 Floor 樓層: 2/F



Survey Results 探測結果:

Areas with unusual temperature inside boxes in the infrared spectrum are locations of possible defects

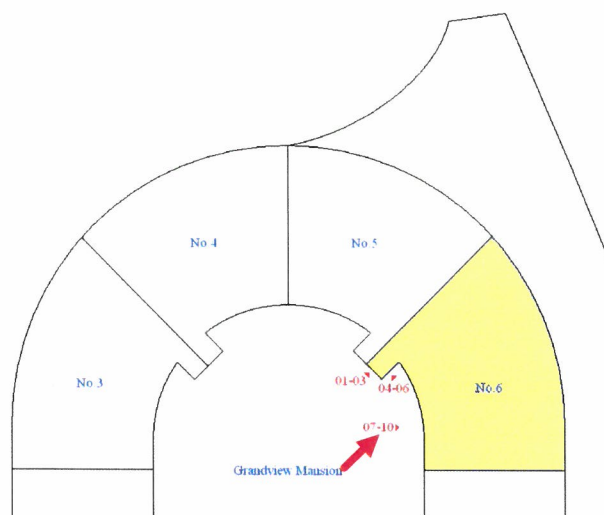
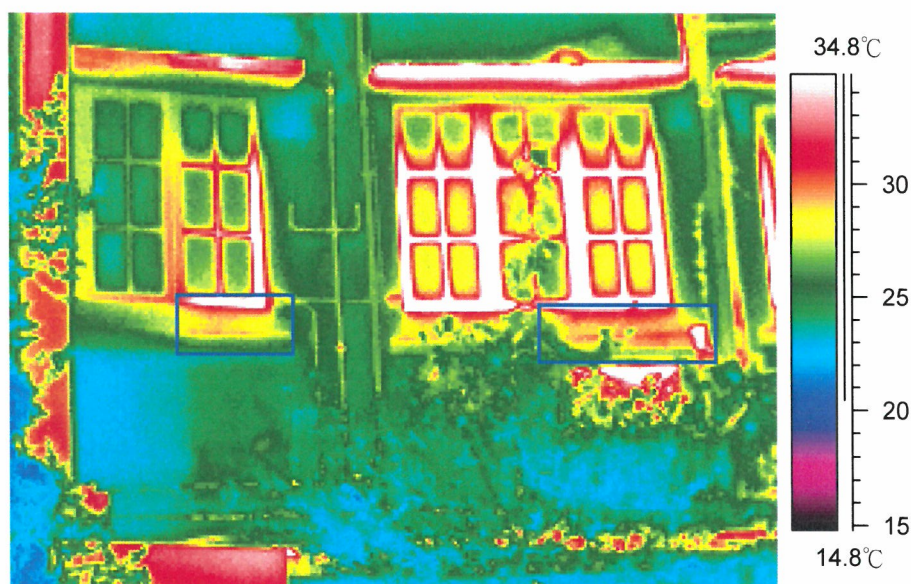
紅外線圖譜中，方格內溫度相對異常的部份是可能缺損的位置。

Classification 分類	Quantity 數量	Estimate Area 估計面積 (m ²)
I (General 一般)	1	2
II (Serious 嚴重)	-	-
III (Other Possible 其他可能)	1	2

Appendix B - Infrared Images and Photographic Records

附件乙 - 紅外線圖譜及相片

Image 圖譜: 09
 Location 位置: Stage 6 Grandview Mansion 偉景大廈6期
 Floor 樓層: 1/F



Survey Results 探測結果:

Areas with unusual temperature inside boxes in the infrared spectrum are locations of possible defects

紅外線圖譜中，方格內溫度相對異常的部份是可能缺損的位置。

Classification 分類

I (General 一般)

II (Serious 嚴重)

III (Other Possible 其他可能)

Quantity 數量

2

-

-

Estimate Area 估計面積 (m²)

2

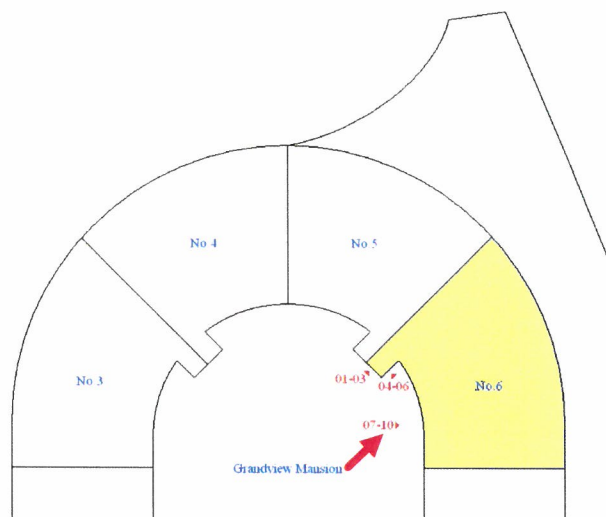
-

-

Appendix B - Infrared Images and Photographic Records

附件乙 - 紅外線圖譜及相片

Image 圖譜: 10
 Location 位置: Stage 6 Grandview Mansion 偉景大廈6期
 Floor 樓層: G/F



Survey Results 探測結果:

Areas with unusual temperature inside boxes in the infrared spectrum are locations of possible defects

紅外線圖譜中，方格內溫度相對異常的部份是可能缺損的位置。

Classification 分類	Quantity 數量	Estimate Area 估計面積 (m ²)
I (General 一般)	-	-
II (Serious 嚴重)	-	-
III (Other Possible 其他可能)	-	-