Synopsis of Hirst Conservation's report into paint failure in the Brunswick Estate. November 2013.

This report was prepared between August and November 2013 in response to concerns over paint failure following the 2010 redecoration under the Hove Borough Council Act 1976.

The research involved an external survey with photographic records of every property, identifying areas of paint failure and their likely causes; paint flake analysis of 26 samples; analysis of geographical and climatic factors; and the relationship between the time of year decoration took place and the degree of deterioration of the paint on each building.

9 different types of paint defects were identified:

- Blistering - caused by trapped moisture under the paint.
- Flaking - caused by underlying old paint becoming brittle and cracking.
- Peeling - caused by painting (or drying) during cold weather.
- Cratering - caused by incorrect application (applied too quickly causing bubbles, or painting un-primed, porous surfaces).
- Staining - environmental causes.
- Mud-cracking - caused by painting in low temperatures.
- Biological growth - caused by dampness on the wall, poor air circulation or little sunlight, poor preparation.
- Failure along fractures - caused by dampness in the cracks or incompatibility with fillers.
- Salt efflorescence – caused by salts emerging from within the walls.

The evaluation of environmental factors did not reveal any overwhelming relationship between position or orientation of individual facades and the degree of paint failure. Larger percentages of the properties painted outside the recommended time period (May to October) showed failure than those painted within this period. The analysis of climatic data showed that 2010 was generally wetter, colder and with fewer sun hours than 2005 and therefore the buildings were likely to have been wetter than in 2005 and it would also have taken longer for surfaces to dry after being washed down prior to redecoration.

6 reasons for failure of the paint were identified:

- Preparation

Patchy paint removal creating weak points more prone to paint layers becoming detached.
Lack of abrasion. This is not stated as necessary on the specification but the consultants advise that it would improve adhesion and prolong the life of the paint finish.
Insufficient washing down – contamination between paint layers weakens adhesion.

Insufficient drying out before painting.
Lack of ‘feathering’ of edges of layers creates differential thermal movement and leads to lifting of the paint layers applied over the top.

- Materials

There appears to be evidence of the wrong paint being used in some instances.
The aging of underlying oil based paints can cause failure of more recent paints.
Without periodic removal of old paint layers, the thickness of the paint on top of the masonry can reach a level where there is loss of adhesion; ‘critical loading’.

- Inherent building defects

Dampness of the underlying building fabric affects paint adhesion, it also leads to algae and growth of other micro organisms which if left between paint layers will result in failure.
Cracks in underlying render create damp zones.
Salts emerging from the building fabric distorts paint layers.
Due to their ornate architectural detailing these buildings have many shaded recesses which are more prone to being dirty and damp , requiring very thorough cleaning and lengthy drying times for good paint adhesion.
The wind-tunnel effect of the ‘pinch point’ at the top of the square may explain the high failure rate of the Brunswick Place properties.
Poor repair of underlying fabric will result in problems with the paint.

- Fillers

The repeated use of fillers in problem areas and use of fillers on top of old paint, compatibility of some of the fillers found, and the depth of paint layers over the fillers all contribute to failure.

- Application

The paint manufacturer’s specification needs to be followed carefully. Almost ¼ of the estate was painted outside the specified season and over 60% of these properties showed failure. The paint takes longer to dry and reach its full exposure resistance in cold weather, and can also become viscous resulting in cracking. Damp areas will also take longer to dry out in cold weather.
The specification produced by Crown paints for the Brunswick Estate and provided to owners by the council gives a minimum temperature for painting of 5 degrees however their standard product specification states 8 degrees minimum. The consultants advise that the minimum temperature should ideally be 10 degrees but that the Brunswick Estate specification should be amended in line with Crown’s general specification (8 degrees).
The periodic removal of previous paint layers is considered necessary to avoid overloading, which can result in paint failure, however this is not required by the specification.

- Environmental

Sea spray and the damp coastal environment mean that these buildings never dry out fully. Records show that 2010 was generally wetter, colder and with fewer hours of sunlight than the previous painting year in 2005. This may

mean that the paint was more vulnerable to failure during the most recent cycle.

Consultant's conclusions and recommendations:

The investigation did not find any inherent weakness in the current paint product and therefore there are insufficient grounds to recommend a change. The areas of failure can be attributed to causes other than the properties of the paint.

The consultants have researched other exterior water based paints and consider that they would perform in a similar way to the current product. An alternative paint (by AkzoNobel) was identified due to its specification for use on listed buildings in the Crown and Grosvenor Estates in London, and the option for trialling this on one property in the next cycle could be taken, however the consultants are cautious of using a different paint due to compatibility issues, and suggest that there should be no change until developments in paint products provide complete justification for this.

The consultants also consider 5 years to be a serviceable life-span for this type of paint and would not recommend increasing the redecoration period. It is noted that the Crown Estate currently has a 4 year redecoration period.

They advise that the way to improve performance of the current product is to improve preparation and application, and it is recommended that the following items are stressed in the advice given to owners, agents and contractors:

- Thorough washing and drying is necessary, especially in cool, shaded zones.
- Abrading will improve performance.
- Feather edging is necessary.
- Proper repairs and maintenance should be given priority.
- Stripping of paint may be necessary in areas of failure.

They also advise that discrepancies between Crown specifications regarding minimum temperature be rectified and that this be raised to 8 degrees on the Brunswick Estate specification, and that painting should only take place when the temperature is not expected to fall below this during the complete drying time of the paint.

Measures to enable further control over redecoration practices are suggested, such as monitoring of paint purchases and independent surveys during redecoration.