

## **RESPONSE TO E-PETITION TO RESURFACE ISLAND BAY ESPLANADE IN ASPHALT**

### **Purpose**

This report has been written in response to a request by the City Strategy Committee after a petition was presented to the committee by residents of The Esplanade, Island Bay. The petition requested that we “change recent chip seal upgrades back to use of Asphaltic Concrete along the Esplanade”.

### **Summary**

1. In Wellington, chip seals are used for a variety of reasons including technical and financial. The current resurfacing strategy has been implemented over a long period of time and provides the city with fit for purpose roads and is comparable to other roading authorities.
2. On-site testing indicates that there is only an imperceptible change in noise levels as a result of the recent chip sealing.

### **Recommendation/s**

That the Strategy and Policy Committee:

1. Receives the information.

### **Background**

This report details how we go about selecting the type of seal to be used on the roads in Wellington and demonstrates how our decision making is supported by good asset management practices which seek to maximise service levels at minimum whole of life cost.

### **Discussion**

#### **History of road construction & maintenance in Wellington**

The majority of Wellington’s roads date back to the late 1800s and early 1900s and were built to the standards of the time. They were built with thin layers of greywacke sourced from the surrounding country side. Over time, surface layers were added and the material of choice was, in many cases, tar and stone.

Over the intervening years the base layers have broken down leaving flexible, highly water susceptible clays which need to be kept dry to support traffic and to prevent expensive road failures. If we fail to keep these underlying layers dry, the resulting remedial work would be very expensive and time consuming and in many cases we would need to rebuild the entire road structure.

Council applies good asset management practices to ensure that we deliver high quality smooth surfaces free of defects. Our roads are generally maintained by applying top surface layers that meet the demands of the particular road whilst protecting the underlying layers of the road. This means that we can keep costs down for the community by not replacing thick layers of expensive underlying material.

### **How we decide on chip seal vs. asphalt seal**

The road seal is the topmost surface of a road. Our primary focus when we select a type of seal for any given road is to ensure the old, flexible, water susceptible underlying pavement structure is kept dry and in good structural condition.

One of the best whole of life cost options for maintaining the underlying structure of pavements is to chip seal them. However, in some areas of Wellington including the majority of the CBD, suburban shopping centres and areas that have higher amenity value, we generally don't use chip seal but rather tend to use asphalts. Other instances where we would typically use asphalt include:-

- High stressed areas of the road such as sharp bends and cul-de-sacs.
- Roads where the surface is considered "rough"<sup>1</sup> to reduce vehicle operating costs to motorists and to provide a better surface for cyclists.
- Where the original design of the road prevents water from draining to the channels and thereby increases the risk of hydroplaning and road failure.
- Where the application of asphalt is considered to be the lowest whole of life cost maintenance option for the road.

In some instances, we simply cannot asphalt since under load many of our roads also flex and bend (over 0.75mm) which make them unsuitable for asphalts. High deflections in pavements supporting asphalt surfaces tend to lead to premature cracking of the asphalt and significant failures at more frequent intervals which leads to additional cost.

### **Main benefits of chip seal**

The main benefits of chip seals are:

- Extending the life of the road by preventing the ingress of water to the underlying layers;
- Providing a highly skid resistant surface which aids vehicle safe stopping distances thereby providing a safer surface for road users;
- Providing better protection than other options at a significantly lower cost.

### **Noise due to chip seal**

Noise generated by different types of surfaces in low speed environments (50km/h and under) can sometimes be a contentious issue with residents. Most overseas research indicates that the difference in noise generated by tyre interaction with different road surfaces at low speeds is minimal.

The research that has been carried out on urban networks indicates that the noise levels on a road that has been chip sealed is dependent mainly on the chip size used and can vary in the order of 3-6dBA . Sound studies tell us that a 3dBA increase in sound level is barely noticeable to the human ear and the sound level would need to increase by 5dBA before most listeners report a noticeable change. It also needs to be noted that different tyre tread patterns generate different noise characteristics at different speeds.

<sup>1</sup> The Council uses the NZTA One Network Road Classification (ONRC) to set appropriate levels of "roughness" across the network.

We commissioned an independent assessment of the noise level created by chip sealing The Esplanade and this indicated that the new surface is unlikely to be more than 1 dB noisier than the old surface, which is an imperceptible change.

### **Achieved Road Surface Asset Life**

The following table illustrates the achieved surface lives for various seal types on our network:

Treatment type	Mean achieved life (years)	Cost per square meter (\$)
Chip seal	10.28	10.45
Asphaltic concrete	10.53	37.50
Slurry seal	7.79	19.70

Table 1 Surfacing Achieved Lives and Costs

If we were even able to completely replace chip seals on the network with asphalt, the cost of providing a waterproofed surface would increase by 4 - 5 times when compared to chip seal.

### **Current Expenditure**

We currently spend around \$8.5M p.a. on road resurfacing.

Whilst some residents and road users would prefer that their roads be sealed with an asphalt surface as opposed to chip seal, the additional cost of this change would be significant at around \$13.4 million per year due to the higher cost of using asphalt, installation of waterproof membrane seals and additional milling requirements.

Our current expenditure profile allows for resurfacing approximately 10% of the network each year. Meaning that over a ten year period, the entire network could theoretically be resurfaced. This is, in our view, an appropriate expenditure profile to meet the requirements of good asset management practice and to ensure that the city's streets remain in good condition whilst keeping costs down for ratepayers.

Any decision to increase funding to allow for more use of asphalt surfaces across the network would need to be made by Council, via the LTP process, and informed by technical and cost analysis. It should be noted that NZTA currently subsidise 51% of this expenditure and it is questionable whether they would support change in an asset management approach that sought to deliver more asphalt re-surfacing. All other road controlling authorities use chip seals as the majority type of resurfacing.

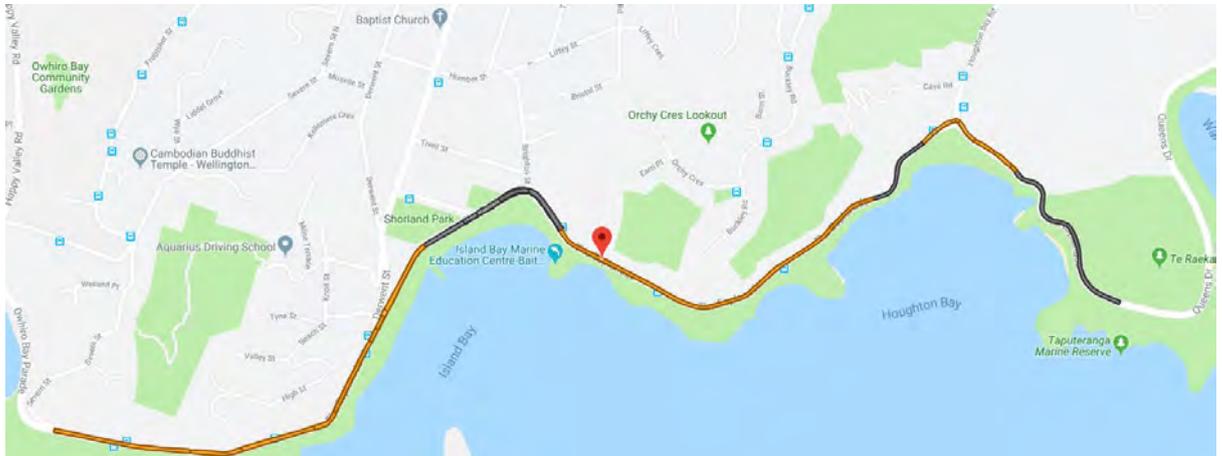
## **The Esplanade**

### **Background**

This section of our roading network provides a route around the coast for heavy vehicles accessing the landfill from the southern part of the city. It also provides access to the south coast for many other road users. Various sections of The Esplanade were chip sealed in March 2018. The majority of the road was already chip seal which had started to crack and had reached the end of its economic life.

### **Surfacing Types and Locations**

Brown = Chip seal  
Black = Asphalt



As can be seen from the above map we have used asphalt on the higher stress areas and chip seal on the remainder. This is in line with our asset management practices.

### **Approximate Costs.**

The costs calculated below relates to the length of The Esplanade that was resurfaced last year which is the area that the presented petition requested we change.

The cost to asphalt the area that was chip sealed last year has been estimated at:

11,825m<sup>2</sup> @ \$37.50/m<sup>2</sup> = \$443,438

This is compared to the actual cost of the chip seal work carried out last year of:-

11,825m<sup>2</sup> @ \$10.45/m<sup>2</sup> = \$123,500

### **Noise on The Esplanade**

In September 2019 we arranged for WSP-OPUS to carry out some noise measurements on The Esplanade to determine whether the noise levels were excessive. Measurements were carried out on 19 September between 10:30 am and 12:30 pm in fine weather.

- Measurements show that the new surface is quieter than expected for a surface of this specification (two-coat 3/5).
- Measurements and previous data indicate that the new surface is unlikely to be more than 1 dB noisier than the old surface, which is an imperceptible change.
- The character of the sound has likely changed to have more of a low-frequency rumble, which may be why residents are aware of a change in the road traffic noise.
- Truck noise and vehicles with loud exhausts are unaffected by the reseal and will remain the sources of the loudest individual traffic noise events on The Esplanade.

## **Attachments**

Attachment 1. Road surface noise from The Esplanade

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## **SUPPORTING INFORMATION**

Engagement and Consultation

N/A

Treaty of Waitangi considerations

N/A

Financial implications

N/A

Policy and legislative implications

N/A

Risks / legal

N/A

Climate Change impact and considerations

N/A

Communications Plan

N/A

Health and Safety Impact considered

N/A