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# WAITAKI RIVER BRIDGES REPLACEMENT

✓ BEST MINDS TOGETHER

Success comes from  
how you combine  
your talent.



# Project Background

- Replacement of two single lane 133 yr old timber bridges
- ECI D&C Contract, construction phase managed under NZS 3910
- Opus involved as Principals Advisor, EtC and Eng Rep



# Project Team - Construction

- NZTA
- Opus (PA, EtC, ER)
- MacDow (Main Cont)
- URS (Design)
- Sub Consultants
- Sub Contractors
- Partnering Committee
- Stakeholders
- ...and 5 Bridges





# Principals Requirements

- Specific requirements and outcomes to be achieved (50 pages + 16 Appendices - design, construction standards and level of service)
- Emphasis on Partnering and Collaboration (project team and stakeholders)



# Design Elements

## Weathering Steel

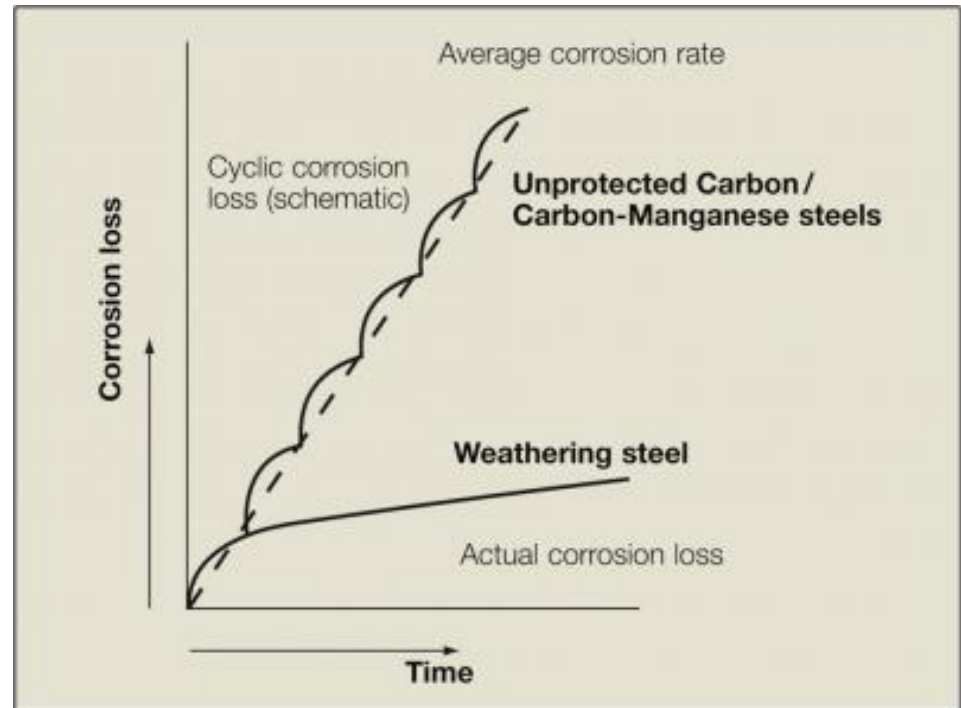
- High strength low alloy steel that forms an adherent protective rust patina to prevent further corrosion.
- Can be left unpainted in suitable environments.
- The alloys compose 2% of steel make-up, with specific elements (copper, chromium, silicon)
- Rust patina was forced with repetitive wet and dry cycles during fabrication



# Design Elements

## Weathering Steel

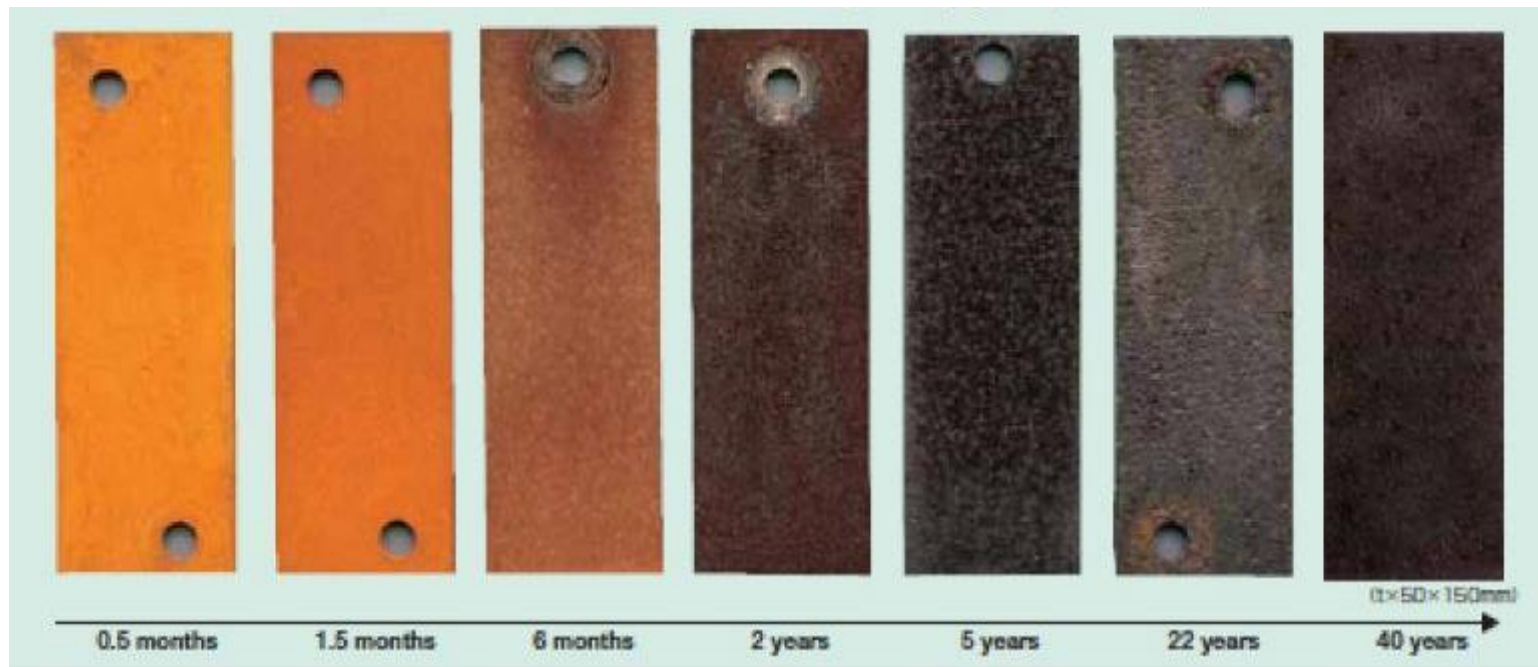
- Figure shows a schematic comparison between corrosion loss of weathering and carbon steel.
- Alloy elements in the steel produce a stable rust layer that adheres to the base metal and is much less porous.
- Stable condition may be reached in a few years and the rust patina protects the steel from further corrosion.
- Regular inspection to treat isolated problem areas.



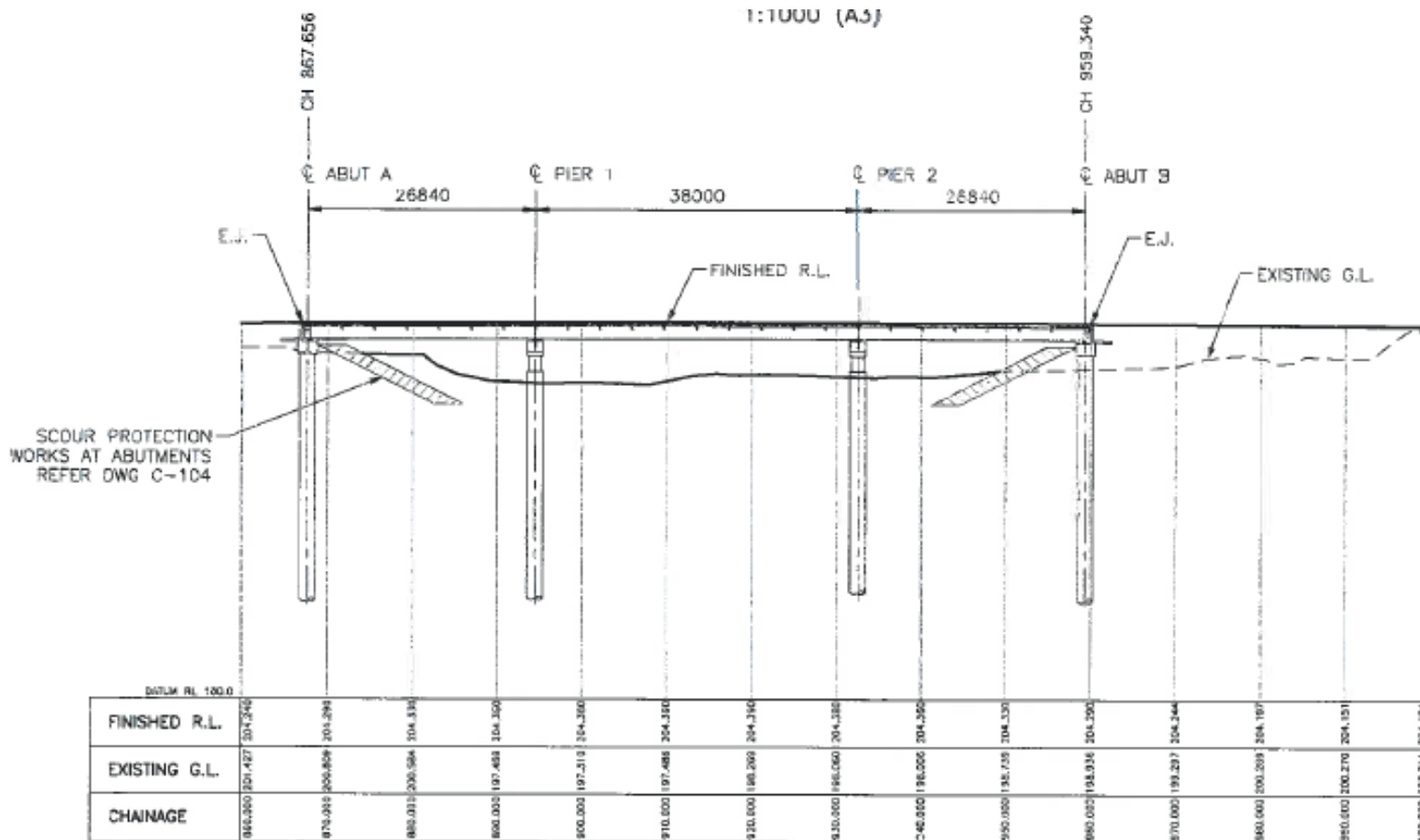
# Design Elements

## Benefits of Weathering Steel

- No painting, reduced maintenance, reduced construction time, environmental benefits, attractive appearance, safety benefits



# Bridge Details



**LONGITUDINAL SECTION**  
 SCALE: 1:500 (A1)  
 1:1000 (A3)



# SH 82 WAITAKI RIVER BRIDGES/NEW ZEALAND TRANSPORT AGENCY

## MONITORING PROGRAMME

Flow up to 850 cumecs

NM Consultant Staff,  
Opus Timaru

Highway Maintenance  
Contractor

Downer EDI Works

Monthly Visual Inspection  
and report within 24 hours

Phone contact from site  
if any significant changes

Cursory inspections  
noting any changes  
when passing over the  
bridges.

NM CONSULTANT: OPUS TIMARU

Report - By exception

Meridian Energy provides flow prediction data to Environment Canterbury (Timaru) who then advise Opus Timaru. Opus directs Contractor to appropriate monitoring

850 - 1200 cumecs

1200 - 1500 cumecs

> 1500 cumecs

Highway Maintenance Contractor, Downer EDI Works

Daily Visual Inspection  
and report within 4  
hours

Twice daily Visual  
Inspection and report  
within 2 hours

Continuous monitoring  
daylight hours,  
reporting at least 4  
hourly.

Bridge closed at night

Immediate phone contact from site if any significant changes

NM CONSULTANT: OPUS TIMARU

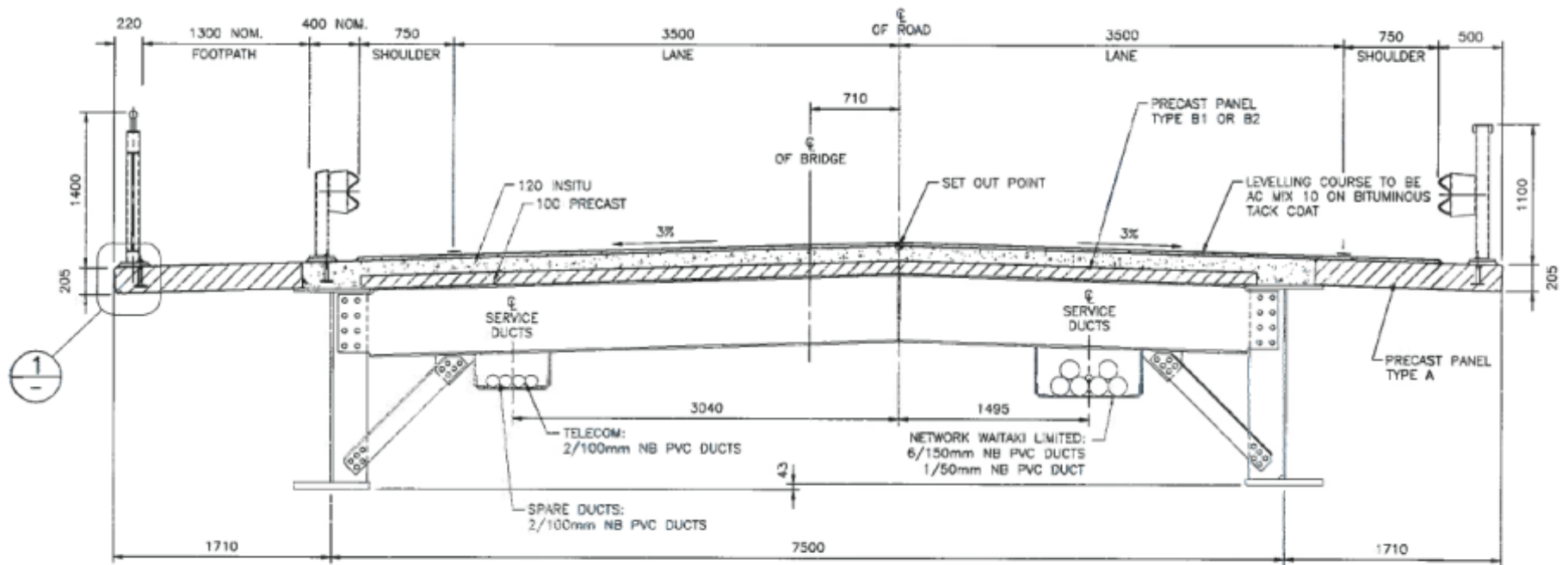
Report - At least weekly

Report - At least daily

Report - At least daily

REGIONAL BRIDGE CONSULTANT, OPUS CHRISTCHURCH  
NEW ZEALAND TRANSPORT AGENCY, AREA ENGINEER, CHRISTCHURCH

# Bridge Details



TYPICAL SECTION AT MIDSPAN

SCALE 1:25 (A1)  
SCALE 1:50 (A3)



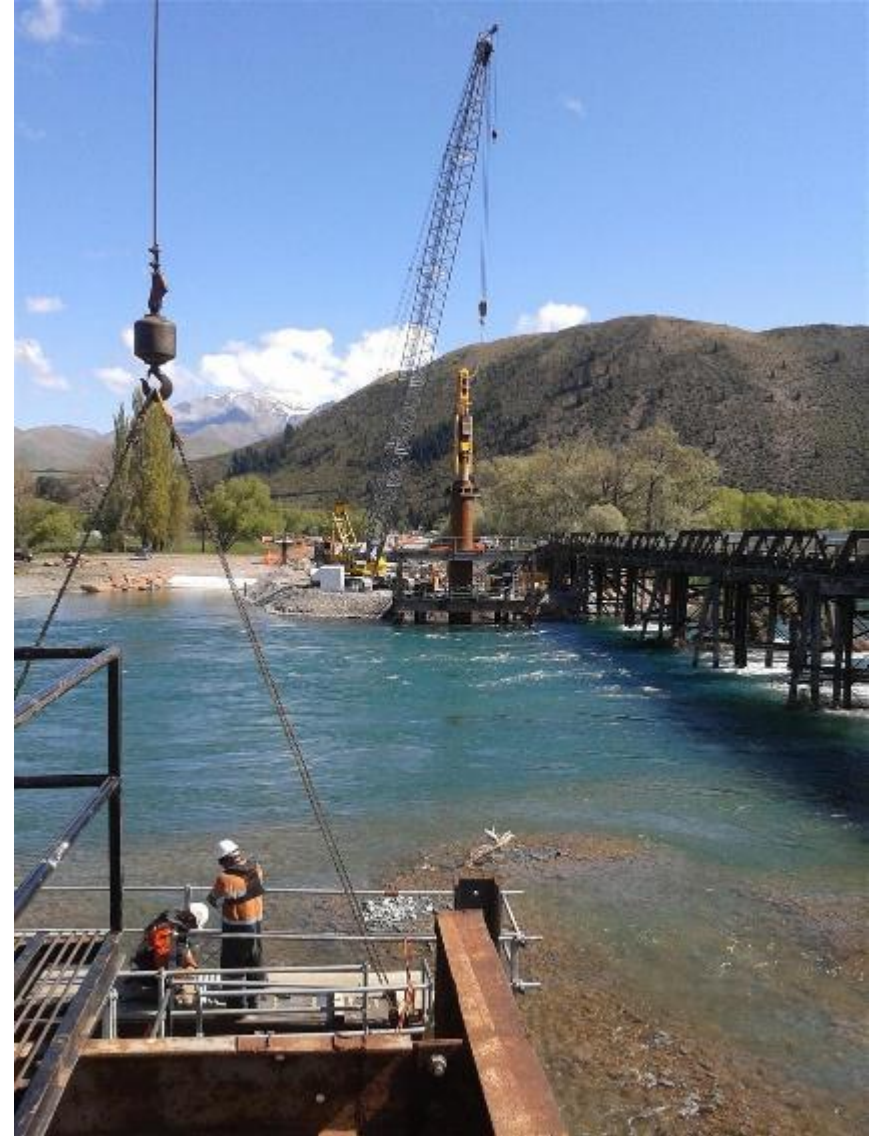
# Bridge Details





# Bridge Construction Sequence

## Piling





# Bridge Construction Sequence

## Column and Pier



# Bridge Construction Sequence

## Bearings





# Bridge Construction Sequence

## Steel beams





# Bridge Construction Sequence

## Precast Deck Units





# Bridge Construction Sequence

## Poured Deck



# Bridge Construction Sequence

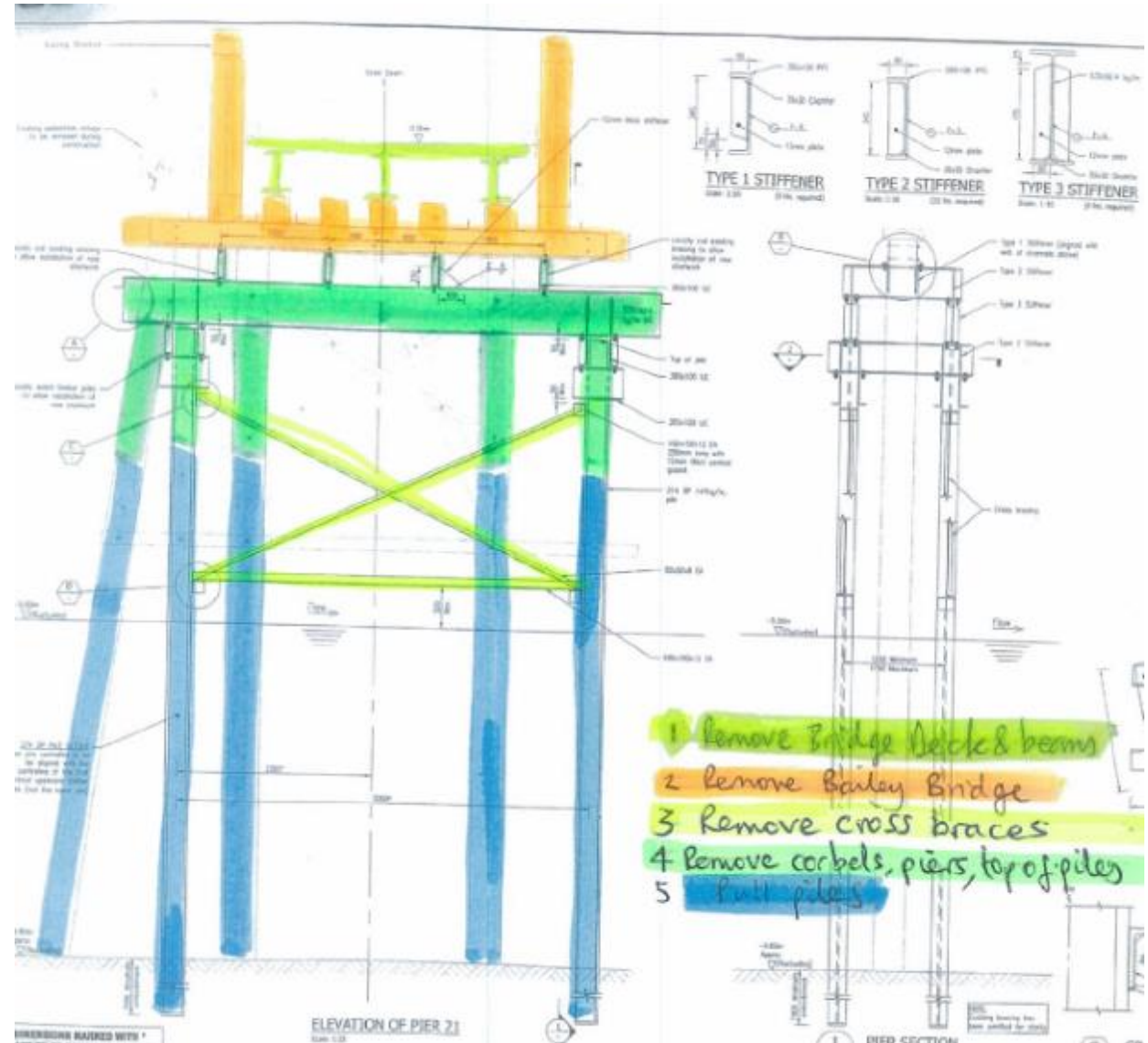
## Poured Deck





# Deconstruction

- Deck spans, some with truss some without
- Pier caps, cross beams
- Piles



# Deconstruction





# Deconstruction



# Display Sections



## THE WAITAKI BRIDGES

THIS HERITAGE DISPLAY IS DEDICATED TO THOSE WHO BUILT  
THE ORIGINAL WAITAKI BRIDGES, OPENED 7 NOVEMBER 1881.

IT HONOURS THE LEGACY OF THE EARLY SETTLERS,  
WHOSE COURAGE, VISION AND HARD WORK  
HAS ENRICHED THE WAITAKI VALLEY.

THESE BRIDGE SPANS REMAIN AS A TRIBUTE TO THE PAST  
AND COMMEMORATE THE 2014 OPENING OF THE TWO NEW BRIDGES.

 **NZ TRANSPORT  
AGENCY**  
WAKA KOTAHU

New Zealand Government



# Completed Construction

