RDH

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One Wall Centre

Glazing Replacement Information Meeting

November 19th, 2011

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Agenda

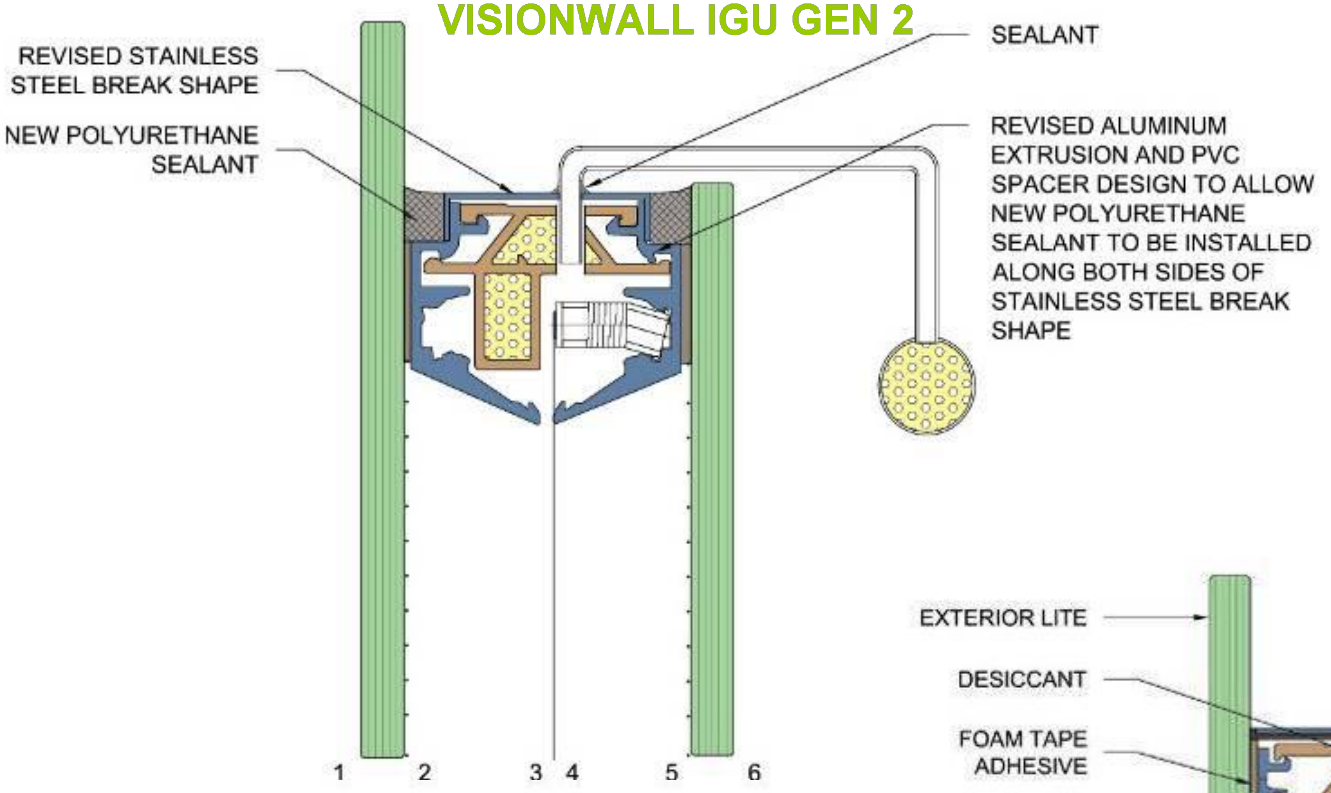
- Background
- Current status
- Glazing considerations
- Discussions with City on glass appearance
- Budget update
- Owner decisions
- Next Steps

Background – Fogging and Overheating

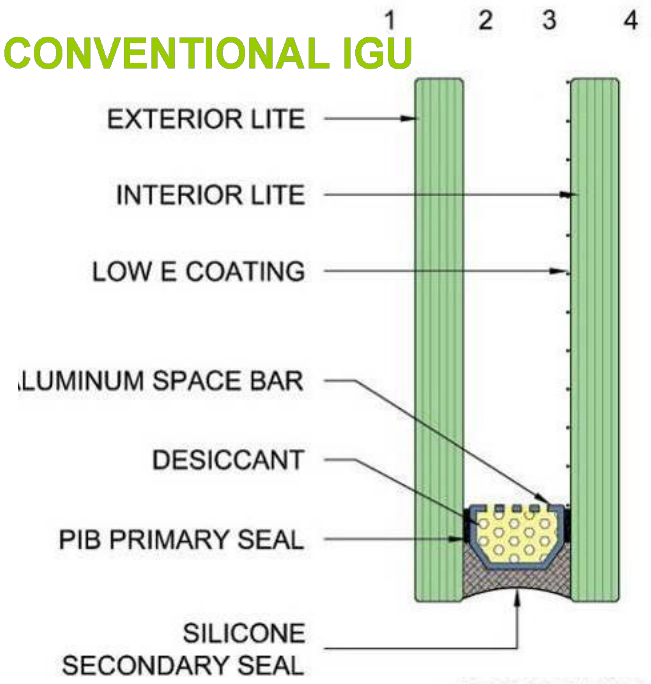
- *Fogged glazing unit and overheating problems since construction:*
- *Fogging problem is worse on some units and better on others*
  - *Severe – Any visible condensation, large corrosion spots, or permanent haze visible from 3m*
  - Moderate – Any corrosion/oxidation of the low-e coating visible from 3m
  - Minor – visible corrosion visible only less than 3m away
  - Clear – No visible corrosion

Background - Vision Wall IGU

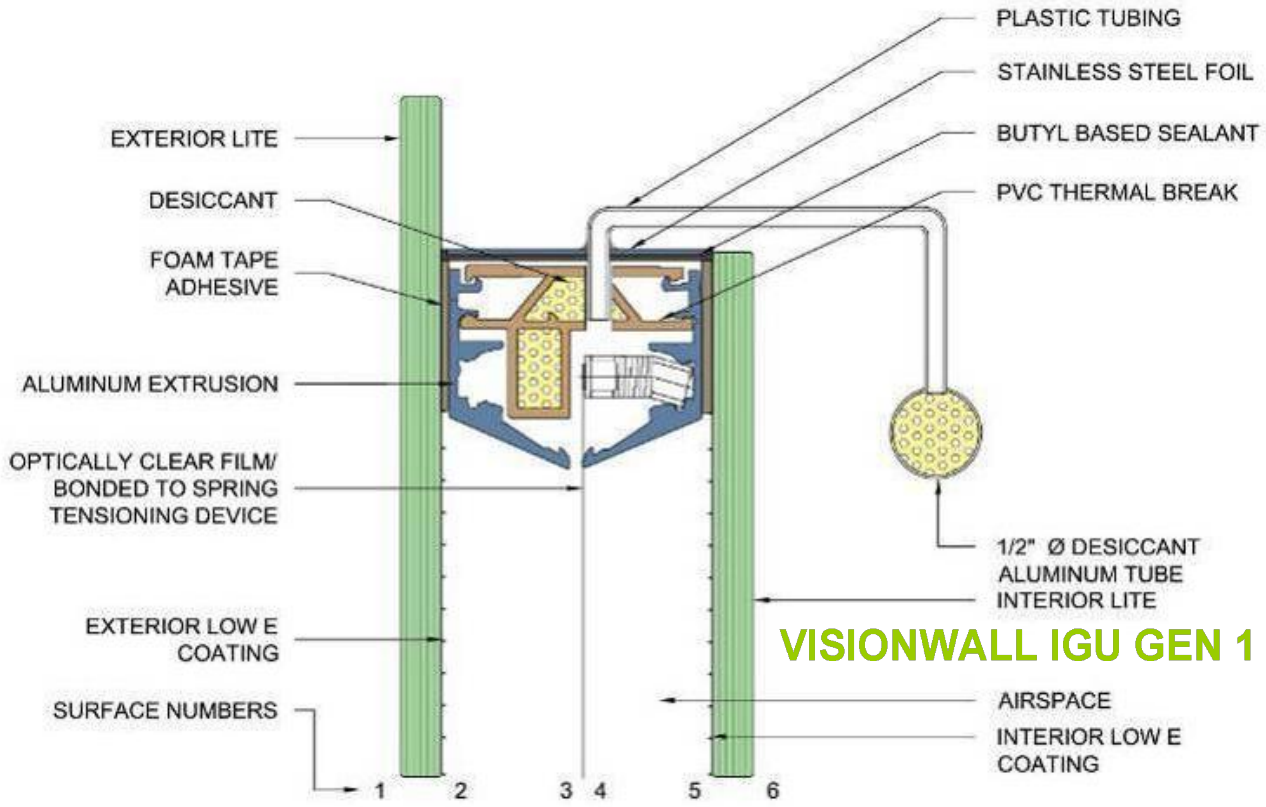
VISIONWALL IGU GEN 2



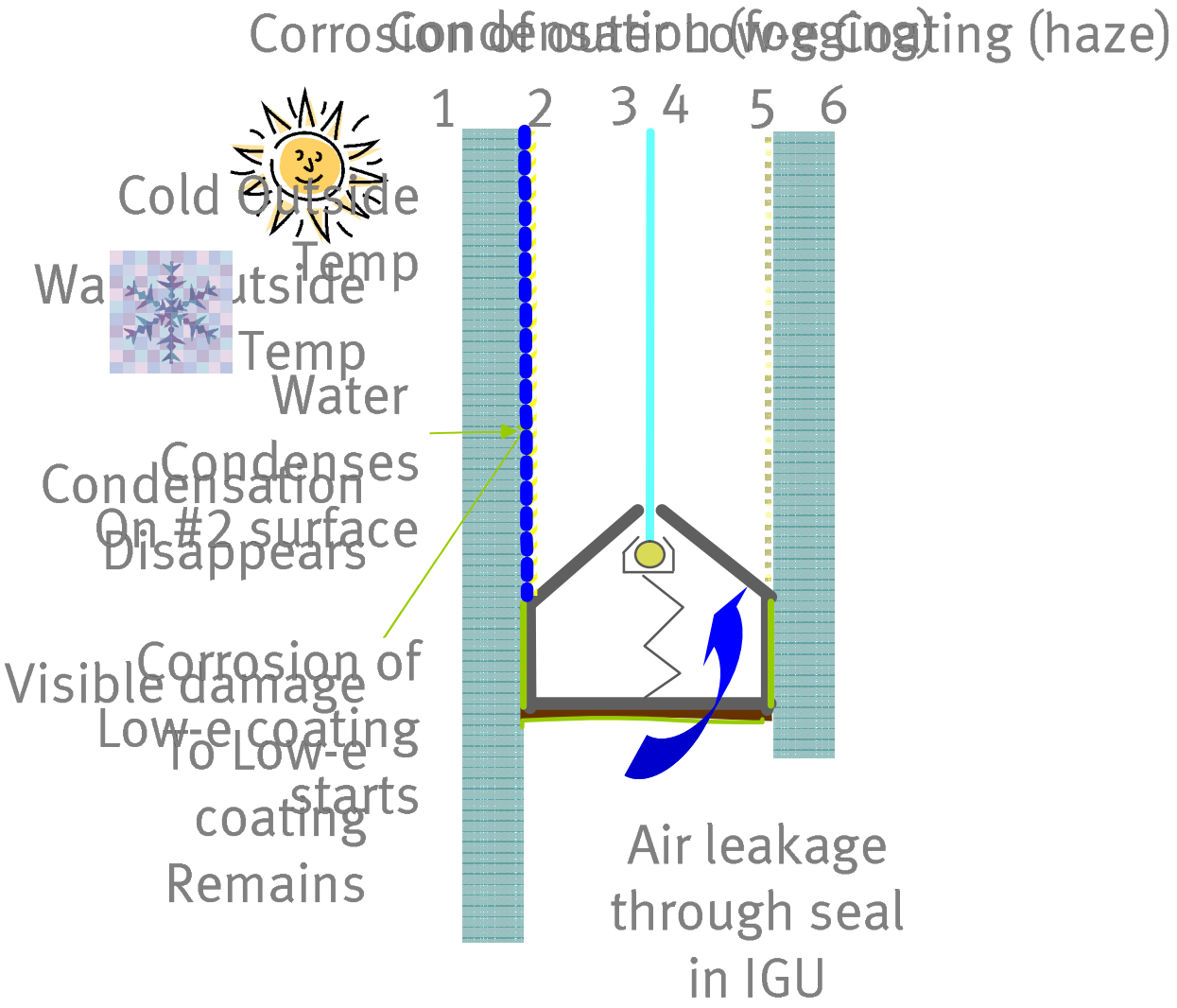
CONVENTIONAL IGU



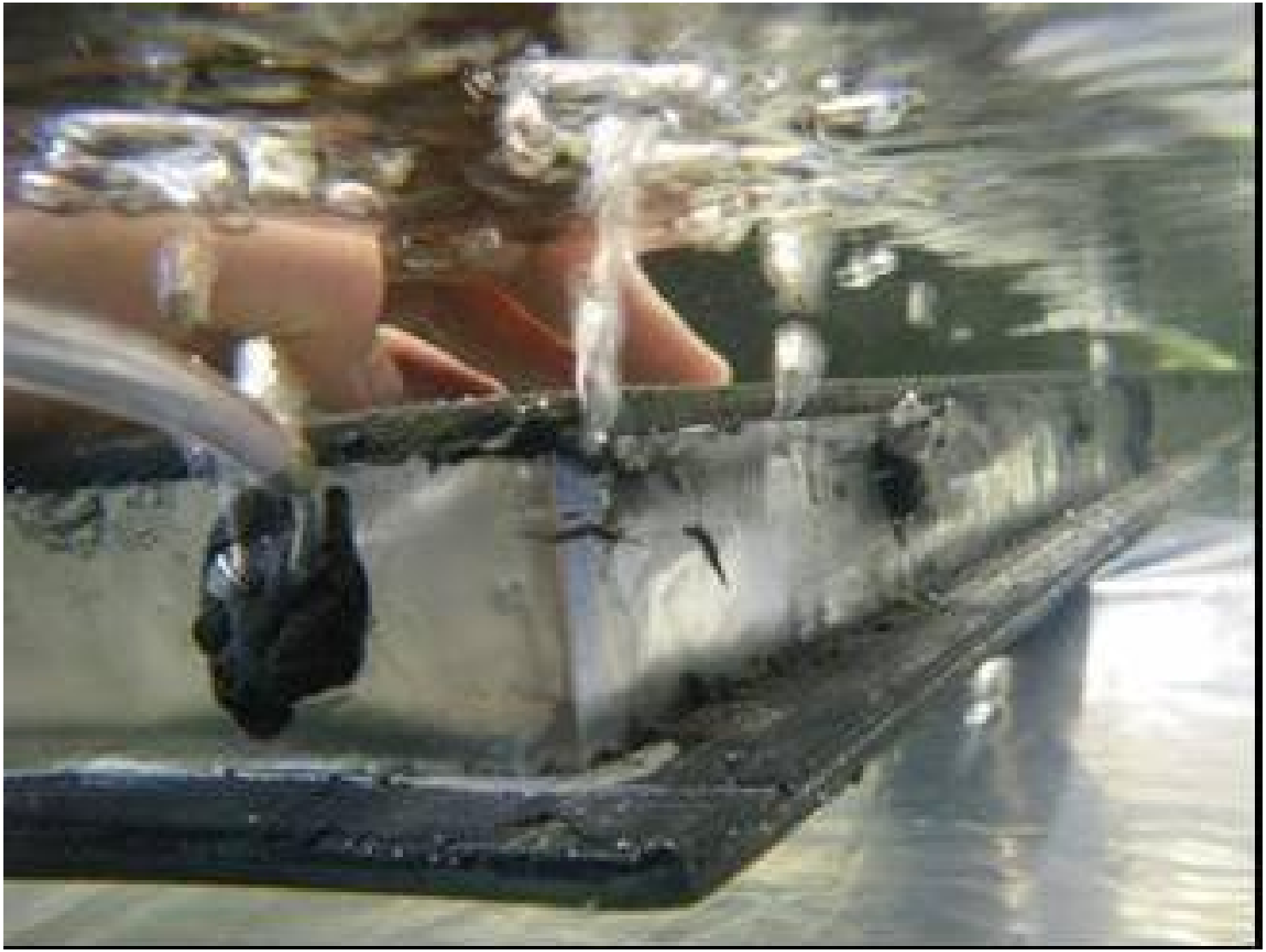
VISIONWALL IGU GEN 1



Background - Fogging Mechanism

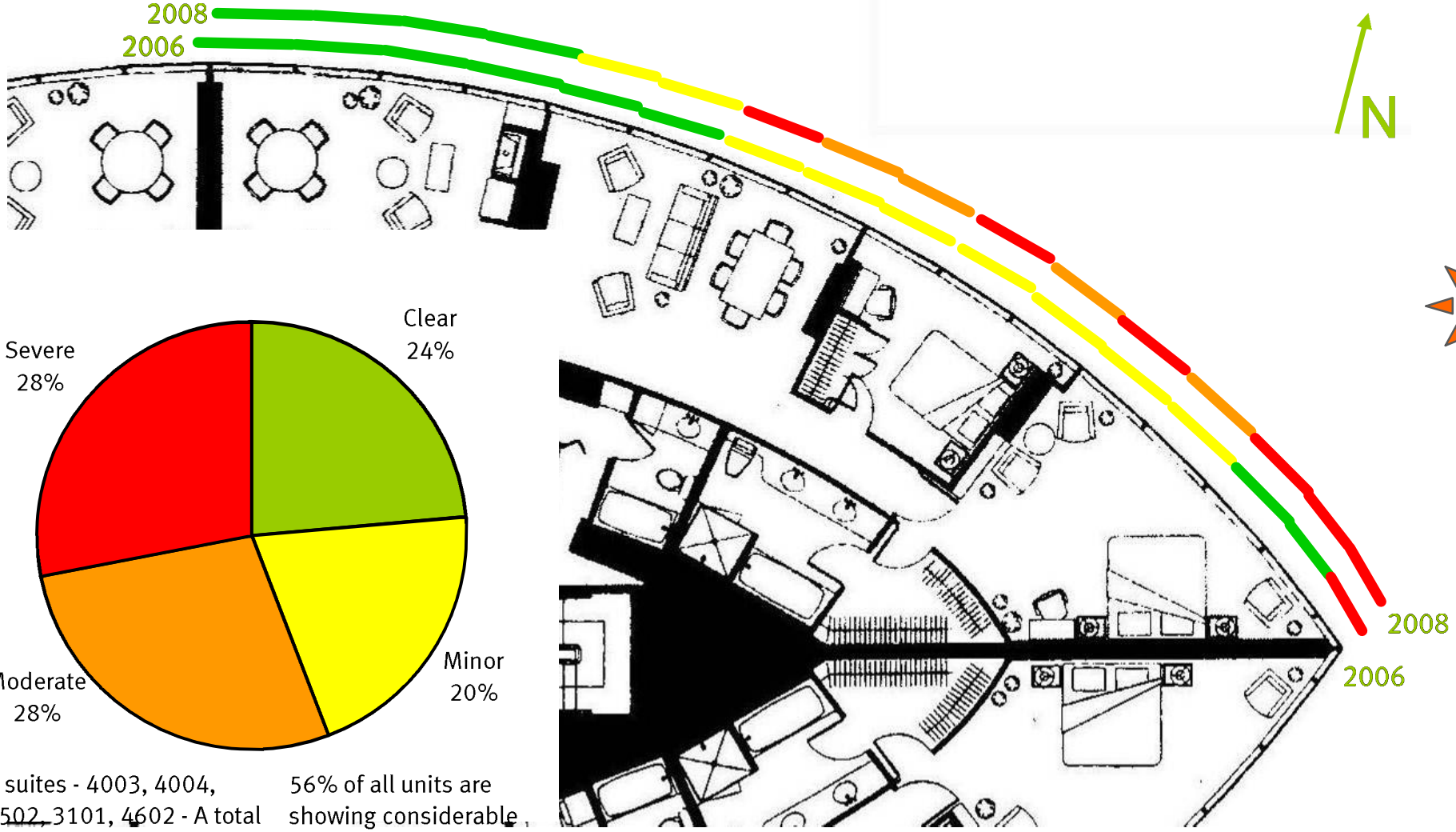


Background - Failure



Background - Failure

Background - Increased Fogging with Time – Suite 4502



5 suites - 4003, 4004, 4502, 3101, 4602 - A total of 93 IGUs reviewed

56% of all units are showing considerable low-e corrosion

2010 to 2011

- Mechanical study to determine the cause of the overheating problem and if it could be resolved by the use of high performance clear or dark glazing.
- Design drawings and specification for glazing replacement and more accurate pricing
- Submission to the City for dark glass replacement units to match Hotel
- Investigation of Hotel Glass for Wall Financial
- Mechanical Study is the critical path since both the design drawings and submission to the City will rely on the results.

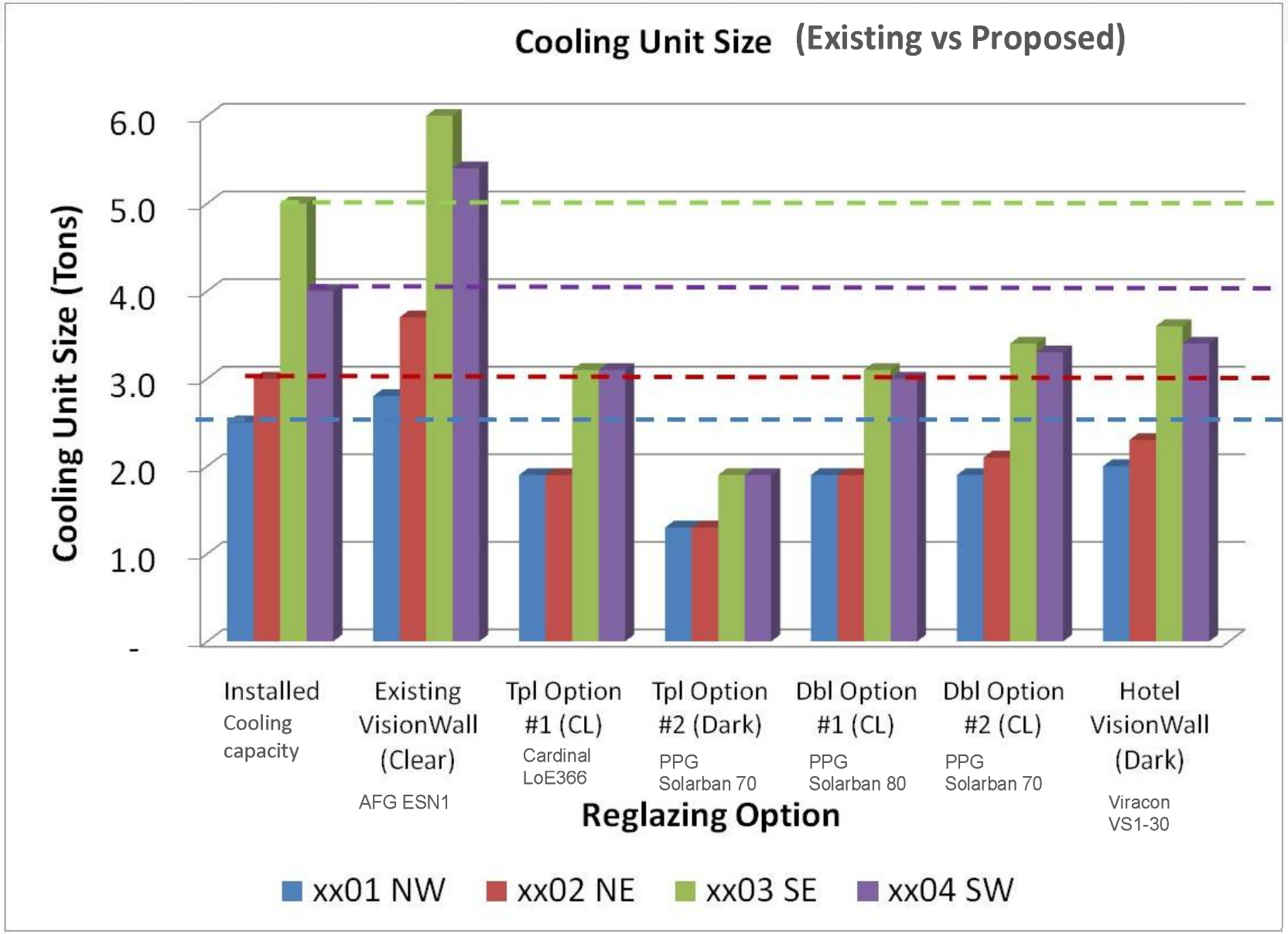
Hotel – Results from 2010 investigation

- RDH investigated the hotel windows in 2010.
- Same problem as residential but less visual corrosion as a result of:
  - Lower on the building (Less wind and stack pressure)
  - Different (more corrosion resistant) Low E coating
- Wall Financial is now aware that premature failure of their windows will occur.
- They have a much larger timeframe before they will need a full replacement program.
- Wall Financial has become much more engaged in our project now they understand that the issues are building wide.

Mechanical - Results from 2010 Study

- Critical path
- Required to determine if dark glass is required to resolve overheating problem.
- No mechanical as-built drawings were ever produced. Information had to be field measured for all suites.
- Building energy model was completed for a typical floor using DOE analysis program by a forensic mechanical engineering company.

Mechanical - Results from 2010 Study



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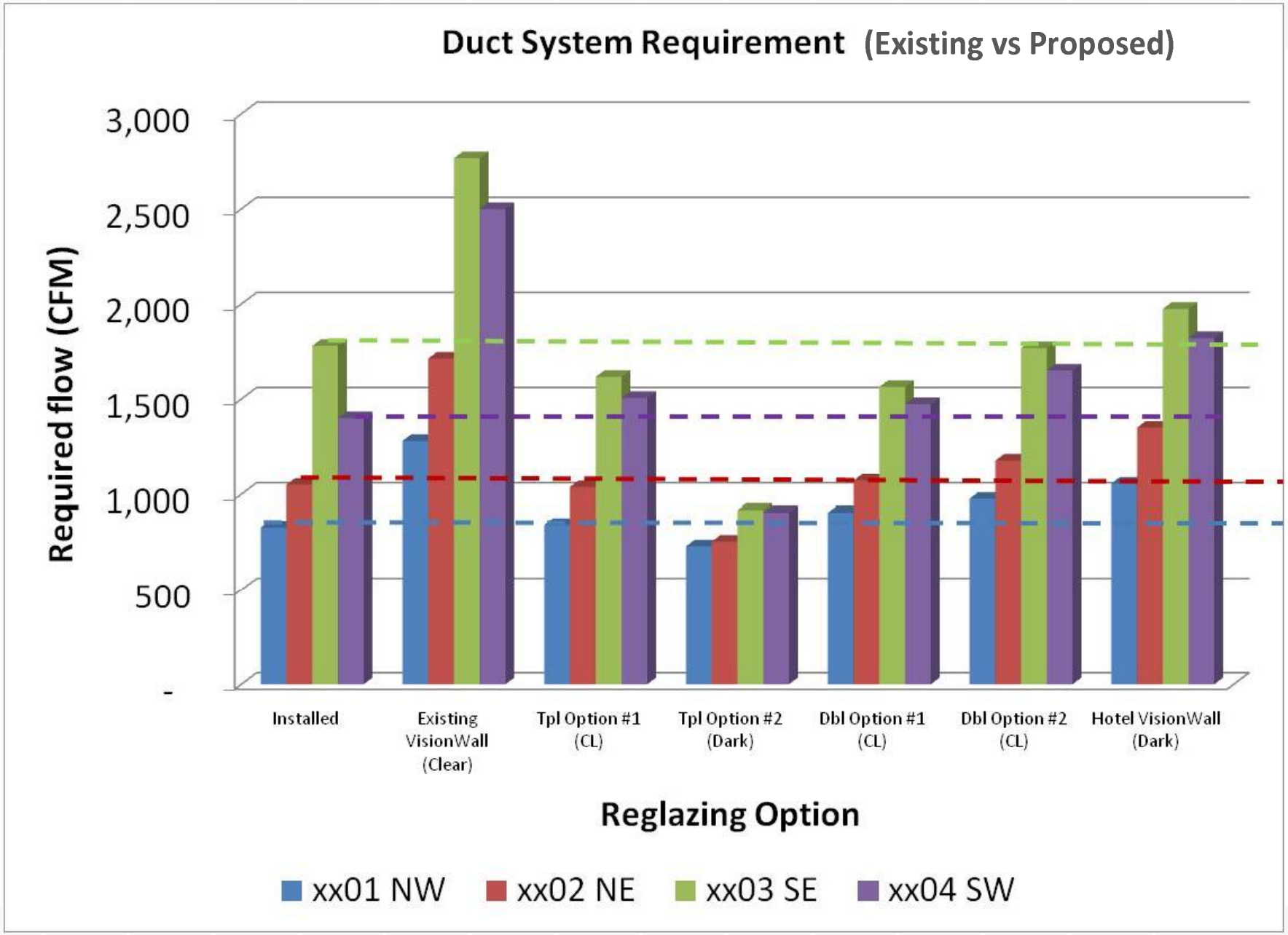
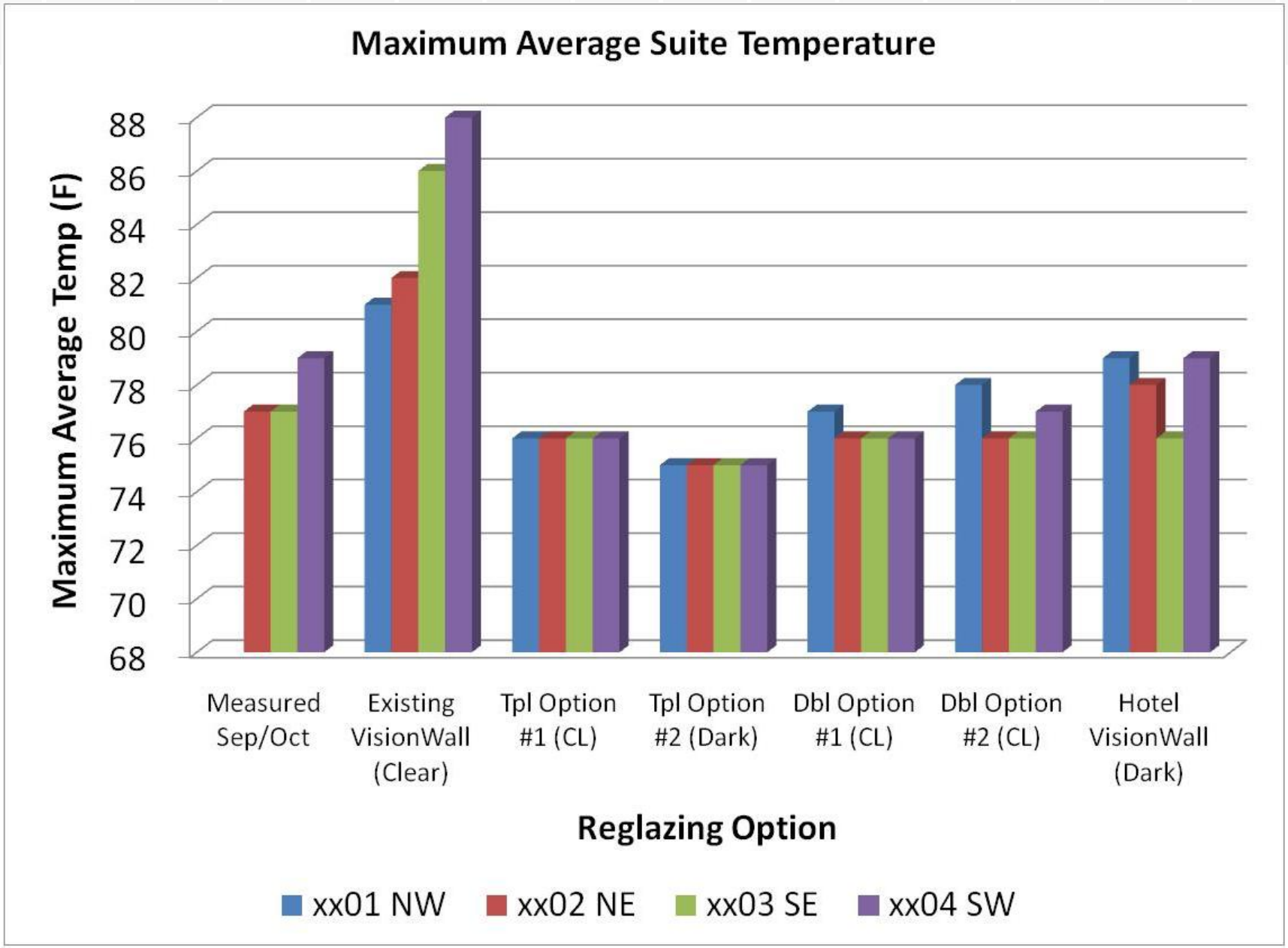


Mechanical - Results from 2010 Study



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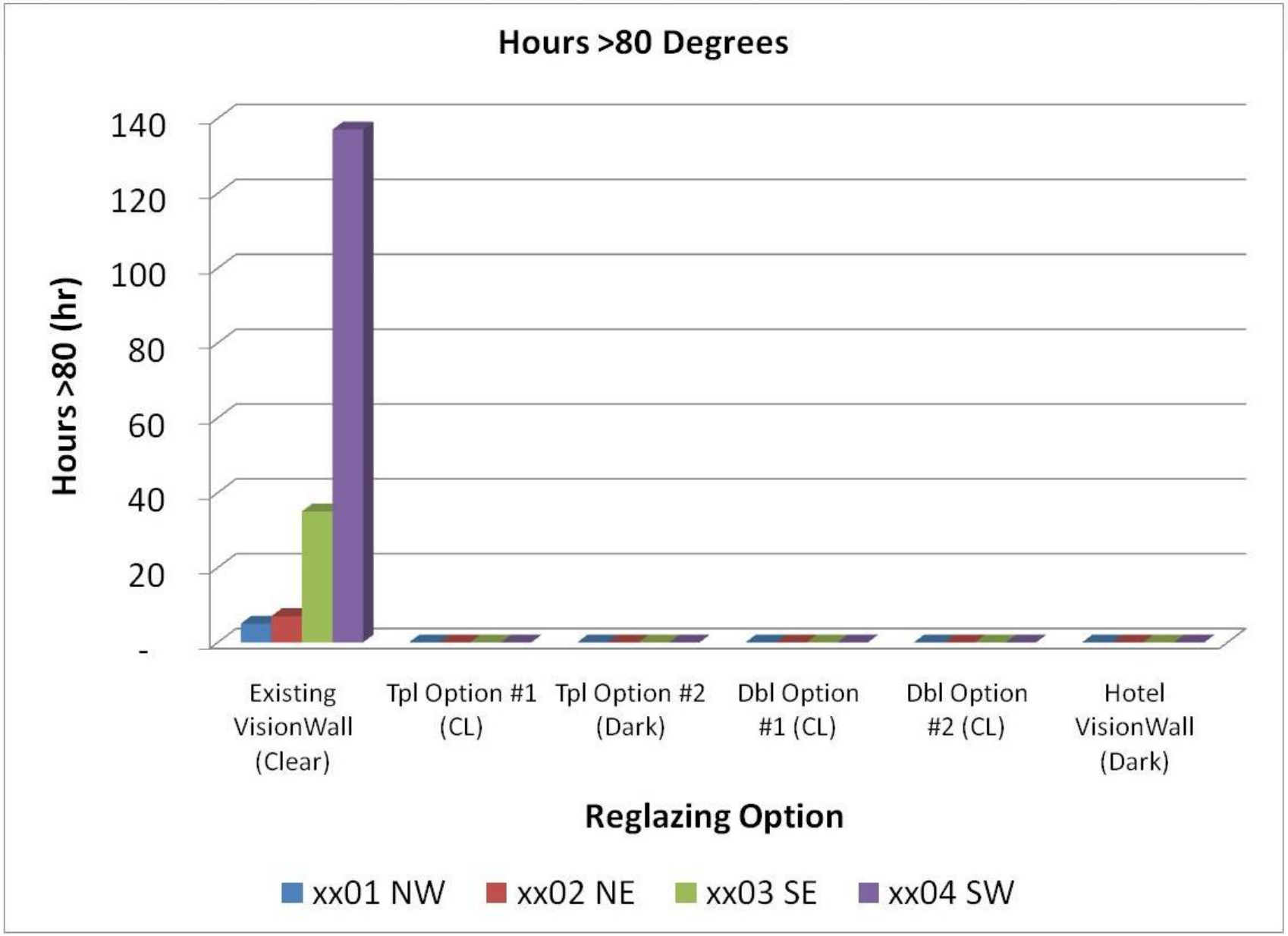
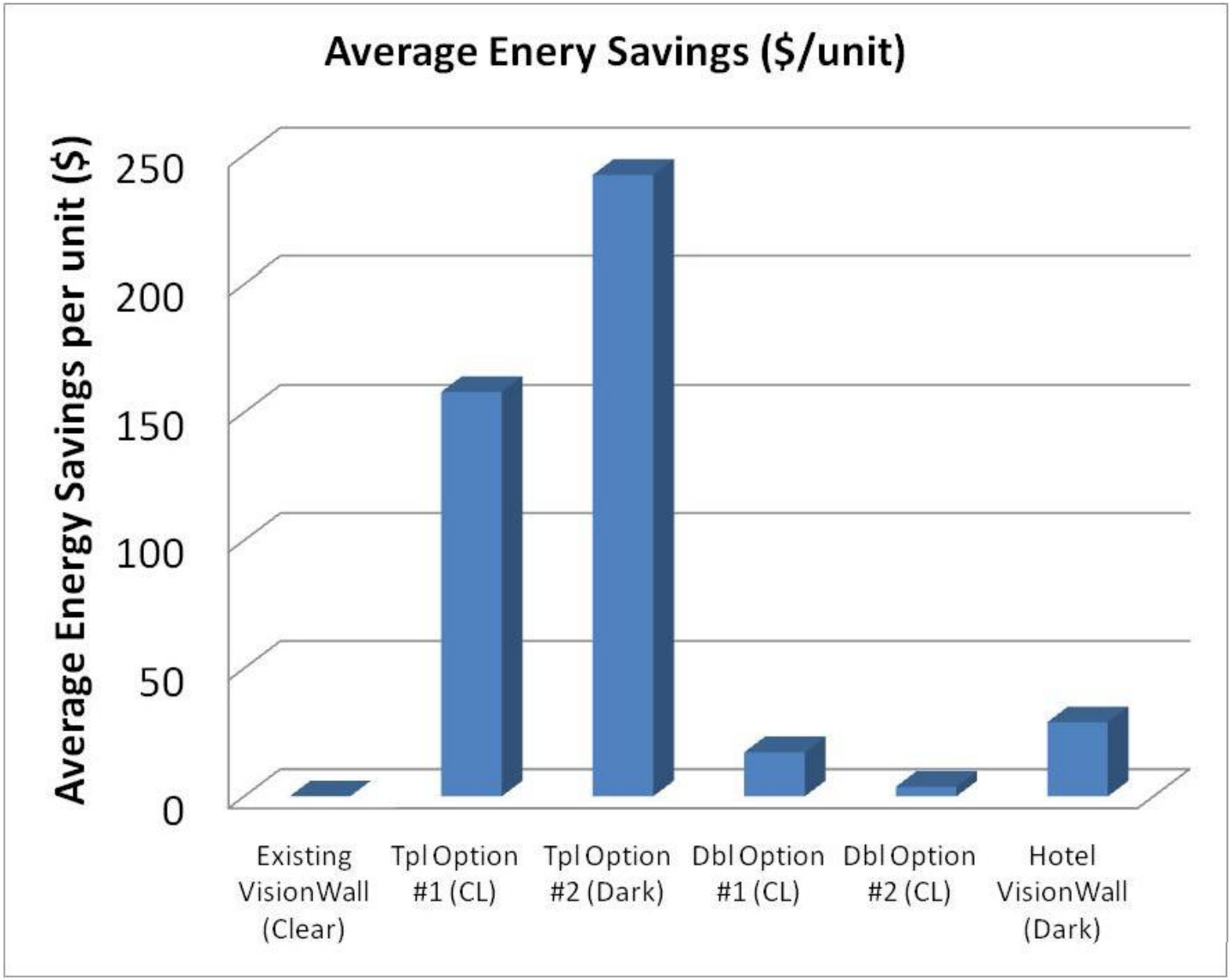


Mechanical - Results from 2010 Study



Mechanical - Results from 2010 Study

- Cooling units are generally undersized
- Ducting is significantly undersized (was not upgraded)
- New high performance clear glazing will provide similar performance to hotel dark glass.
- Mechanical under design can be resolved using high performance clear glazing in most suites
- Energy savings from glass replacement will be negligible

Current Project Status

- Concepts for stage system were completed and included in the contract documents
- Final glazing options selected and incorporated into the contract documents after meetings with City and council
- Drawings and Specifications have been completed and were issued for pricing by stage and glazing contractors last month
- Pricing has been recently received for staging and glazing replacement

Glazing Considerations

Factors considered in the selection of glazing:

- Colour/tint/opacity
- How much light the glass transmits through (VLT)
- How much solar heat is allowed through (SHGC)
- Thermal Performance (U value)
- Reflectivity inside and outside
- Double glazed versus triple glazed
- Sound transmission
- UV transmittance
- Cost

Glazing Considerations

- The existing glazing for the hotel portion of the building is only available from one source
- The type of low E coating used for the hotel portion is not as readily available and will become more difficult to obtain in the future
- Matching the hotel glazing is difficult and more expensive
- The residential portion of the building a relatively clear glass with a slight green tint and is not a problem to match

Glazing Considerations

Glazing as specified:

	Specified	Current	Effect
VLT	› 30% and ‹45%	65%	Less light
SHGC	‹0.27	0.50	Cooler
U value	TG‹0.14	0.17	Less energy
	DG‹0.27	0.17	More energy
Reflectivity	Low	Low	No change
STC	To match existing		No change
UV trans	8%	1%	More UV
Weighted UV trans	30%	44%	Less WUV
Colour	Grey/blue	Slight Green	

Glazing Considerations

Glazing Options as specified:

Triple Glazed:

- Viracon VS1-40
- Guardian N50
- Viracon VS1-30 (for Level 31)

Double Glazed

- Guardian SN62
- AGC TiAC23

Additional operable vents option (at bedrooms)

Discussions with City on glass appearance

- Nick Milkovich, representing the Hotel and the Strata Corporation, along with RDH has met with the City Planning department several times to discuss the possibilities of different glazing tints/colours and darkness
- City feedback provided by Planning Department to help the glazing selection process

Implementation

- Given the issues at hand, and the need to remedy the existing problems, a construction process is necessary

RDH Construction Management

- RDH has a team of specialists
- Seasoned superintendents and project managers
- Solid track record and reputation
- All construction activity performed by experienced trade contractors
- All work bid to trade contractors on a competitive basis

Typical RDH CM Rehabilitation Projects

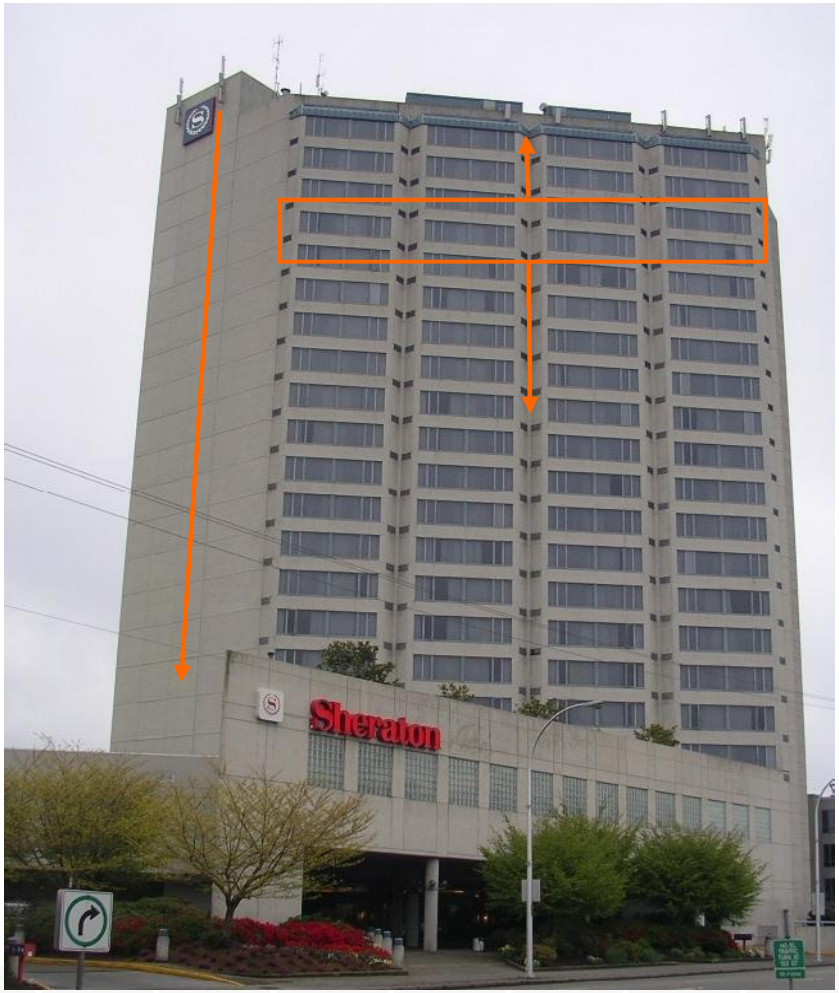
- Governor's Tower and Villas; one of the largest and most complex building envelope rehabilitations undertaken to date.
- While RDH works on projects of all types and sizes, if the issues are large, complicated, and challenging, RDH gets the call.
- Project costs initially budgeted at $30 million by others.
- Final RDH rehabilitation costs less than $26 million.

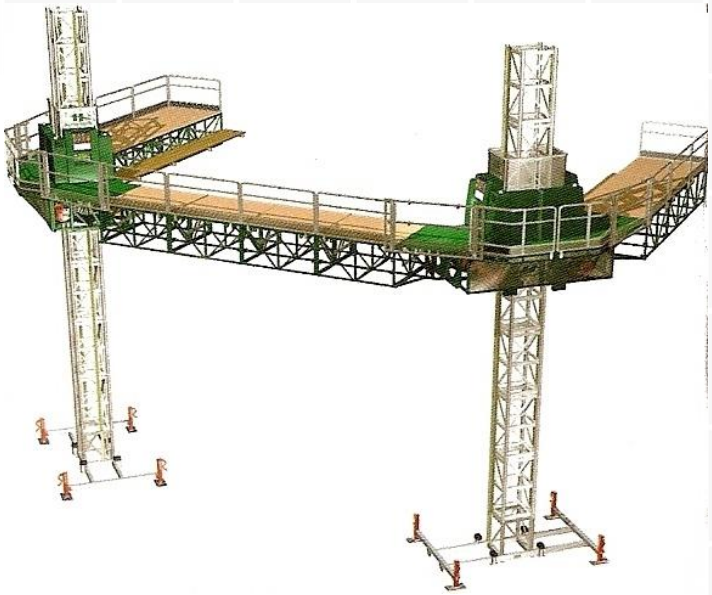
Typical RDH CM Rehabilitation Projects

- Royal Quays and Pacific Point. Complex and varied.

Typical RDH CM Rehabilitation Projects

The Sheraton Guildford had some issues similar to One Wall





Typical RDH CM Rehabilitation Projects

- RDH managed a cladding replacement program on the Sheraton Guildford Hotel while it carried on business as normal.
- RDH developed a rehabilitation strategy based on utilizing mast-climbers during the off-season to minimize disruption to hotel activities.

Typical RDH CM Rehabilitation Projects

- Project complete.
- The owners of the property indicated no year/year loss of volume and minimal disruption to commercial activity throughout the process.

Logistical Considerations - Access

Accessing the work area is not straight forward

The height, exposure, and tight location makes this project especially challenging

Logistical Considerations - Access

Swing stages are the conventional method for maintenance work however they aren't suitable for an extended construction project of this nature.

Swing stages have significant limitations with respect to efficiency, weight capacity, inclement weather, and wind.

Logistical considerations – Access Safety

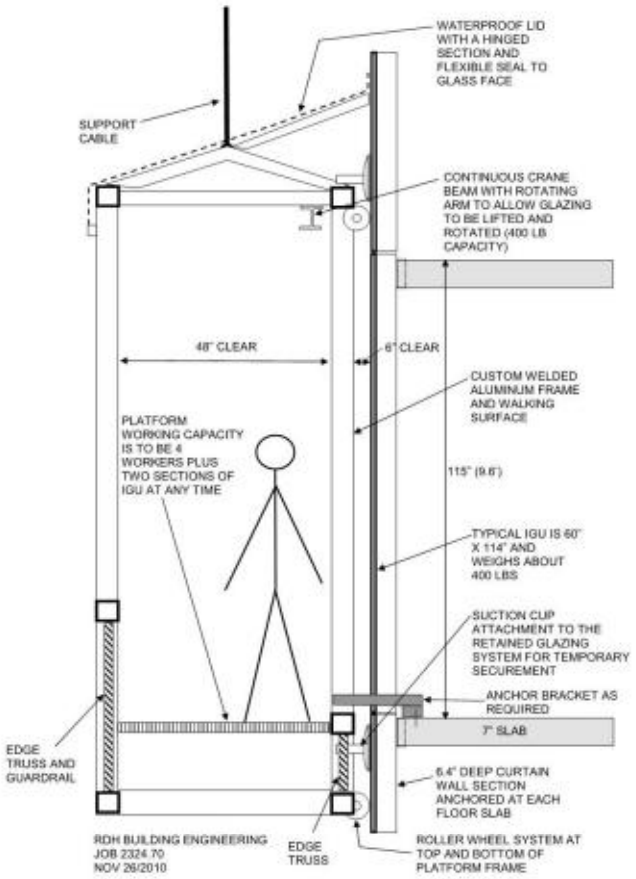
Logistical considerations – Material Movement

The sealed glazing units are very large, heavy, and difficult to handle.

Special methods will be required to remove, install, and transport these components.

Logistical considerations – Access Concept

We needed to explore custom solutions to save time and money and to reduce the risk.



Call for Proposals

- We have received proposals from a total of 8 contractors to perform the work
- We have excellent concepts for the suspended work platform
- We have strong proposals from glazing contractors to replace the failed sealed units

RFP Results – Revised Budget

Construction Costs	$5,154,325
Construction Contingency	300,000
Construction Sub Total	**$5,454,325**
Permit	$55,000
Engineering	250,000
HST	685,000
Warranty	158,000
Project Total	$6,600,000

The contractors are prepared to sign price contracts on these numbers

Owner Decisions

We've gone as far as we can go. The owners now need to make some key decisions:

- Is the repair work going to move forward?
- Confirm which of the glazing options will be selected.
- Decide on other options
  - Additional vents
  - Potential cost savings
- Assemble the construction team

If this problem is going to get resolved next year, the owners need to start finalizing decisions very soon.

Next Steps

- Design and concept refinement
- Contract negotiations
- Full scale proof of concept mock-ups
- Preliminary construction activities
- Prepare for construction to start March 2012

Construction Implementation

Discussion