

Submission Papers to BIA On Proposed Changes to E2, VM1 and AS1

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Hitex would be keen to debate various issues and provide more information including drawings on request.

Preface

Where possible numbering sequences originate directly from page reference of B2 and E2/AS1. General comments are included in section 15 and 16. Additional referenced support material is given its own separate section.

Appendixes are referenced in the text.

Appendix materials include Hitex Research Bulletins describing the Hitex Drying Research undertaken to get a better understanding of what is happening in the walls causing the current problem.

Information bulletins are Hitex's own literature that circulates to architects and designers so they are aware of functional requirements of specific issues.

Hitex has included some drawings of its own which the BIA may consider useful Hitex has included in the submission the Volume 2 drawings, which have been written over to show Hitex's comments. Several extra deck details have been inserted.

The additional sections in these papers have been included by Hitex to improve the management of the Act. These points also need addressing.

1. The Consultation Process

Hitex wish to include in the BIA Consultation papers these comments on changes to the Act/NZBC.

- 1.1 The New Zealand Building Code was a major change. Major changes often have teething problems. None of the authors of the code would have envisaged what they wrote would last 1000 years. Not even Aristotle was so fortunate.
- 1.2 Therefore the Act requires the code to be managed and updated and upgraded. All on a regular basis. This should include things like Product Certification, VM, E2, B2 etc., etc. These and probably every clause in the Act needs to be viewed and reviewed regularly as the years go on.
- 1.3 Therefore what needs to happen firstly is a review mechanism needs to be created. Something people from within the BIA and from the outside of the BIA can follow to get things humming and ticking.
- 1.4 The majority of the things in these consultation papers Hitex would have considered to be things that BIA would normally be doing if they were managing the organisation on a day-to-day basis.
- 1.5 What has happened here is these BIA Consultation Papers have been enlarged to such a degree the important things may become missed or over shadowed.
For example most of the industry and homeowners want durable treated timber, they want to know who to blame and they want to make sure it never happens again. Saying there will be more inspections and changing a few details are management things and should be done by

BIA anyway. These changes do not answer what needs to be done and why it will work better in the future. If what BIA is saying is it cannot decide whether treated timber should be used or not then I put it to you this way.

Step 1 get from Carters and Fletchers and undertaking that by changing to untreated timber there will not be a higher percent of rotting homes than when we had treated timber, if there is they pay to fix it all up (and replace every house).

If that does not solve it and BIA are still unsure then surely the BIA would then seek public comment like this.

Step 2 Carters and Fletchers will not underwrite the timber if it rots so we want a public opinion poll that if the timber rots the homeowners will pay the bill

That would have taken one page of consultation papers and we know the result of both steps.

- 1.6 Whilst it is encouraging to get the opportunity to comment on aspects of changes, Hitex is left wondering that this consultation process should have been directed at only 2 or 3 primary aspects.

- A) Treatment
- B) Management of the Act
- C) Liability aspects of non-compliance causes. At construction and post construction.

Surely these three things are what the BIA is under fire for and what the construction industry is seeking both guidance and protection on.

I am sure homeowners would be thrilled and relieved if they were given answers to these three problems.

2 **Treatment of Timber x B2/AS1 5.1.1**

Hitex Plastering Ltd requests the treatment of all framing option.

Treatment level to H1.2 minimum standard.

Hitex makes this request in relation to the following.

- 2.1 Hitex Plastering installs exterior cladding, which is designed to keep water out. This is an idealistic parameter because buildings settle due to timber movement, which causes pressure at sealant joints, control joints, abutments to other materials etc that under pressure often fatigue. This leads to cracks and tears in the fabric of the cladding or jointing and connecting materials. These then often let water in. Often the homeowner does not understand the significance of the leak, as it causes no temporary loss of amenity – unlike a car engine missing or brakes squeaking. Homeowners often choose to ignore looking or the leak itself unaware that damage is being done image our 70 year old parents scampering over a roof to check a flashing. Often in the past 50 years leaks have been nuisance things but rarely (accordingly to FRI there has not been a reported case of dry rot for 50 years) any damage results directly to carpet and linings. The homeowner therefore allows the carpet to dry out and carries on not realising that the change to untreated timber means the house is now stuffed, or at best needs thousands of dollars of repairs to the structure.

The question therefore is one of liability. Who is responsible?

- The manufacturer for allowing a design to fail at such a critical position on the wall.
- The installer for the detail whether it was done correctly at the time.
- The homeowner for failing to either call for an inspection if they do not want to do it themselves or to carry it out themselves.
- The designer for allowing the design.
- The TA for allowing it under Alternate Solution or a variant to an Acceptable Solution.
- The Builder for going along with it all or in some cases contracting with the sub-trades.
- The Insurance company because loss has occurred.
- The bank who is left with a mortgage greater than the residual value of the devalued home.
- BRANZ for issuing an appraisal.
- The BIA for the Acceptable Solution, allowing determinations or allowing Alternate Solutions to continue without guidance.
- The various NZ Standards because they issued a standard.
- Various other manufacturers that supply componentry like wood, batts, gib board, building paper, paints, window makers etc, as it is the combination of these products that comprises the system.

As can be imagined this will make for one messy and costly outcome which legal costs alone would outweigh the simple cost of treatment. Treatment to a robustness so that failure would be minimal unless total neglect by a homeowner is what's necessary. This means the industry has a defence at law. H1.2 should therefore mean treatment to sustain robustness for

- (i) sufficient time for the leak to develop in volume such that it will be identified.
- (ii) time to stop the leak.
- (iii) time to organise trades people to fix it.
- (iv) time to save up or arrange mortgages to pay for it.
- (v) time for the wet elements to dry out.

Sufficiently robust timber would therefore minimise the wasteful expense of litigation costs or expert inspections and the anguish of angry owners. With more robust timber less claims will be made against Hitex which means less defence costs, less management anguish, more stable employment of people and allow Hitex to contribute more to social and economic measures within society.

Hitex can hardly be expected to continue employing and paying taxes if it is persecuted because buildings are not robust. Especially when Hitex is powerless to influence the treatment of timber.

- 2.2 Hitex Plastering makes an EIFS exterior cladding product for houses. Under the legislation the EIFS must remain durable for 15 years. It is not envisaged that the Hitex will need replacing at 15 years but what is expected is at some stage in the future the Hitex will require more and more maintenance to keep water out. This means as time goes on it is expected that the cladding will require replacement mainly because the

cost of repairing will become greater than the cost benefit of repairing. This means the house will be going through a rough period and probably experiencing many leaks. The timber simply must be robust – and the test becomes greater as the cladding (and probably roof, plumbing etc) ages. There is only one time that treatment can be put into wood (economically) and that is at the mill before it gets made into frames and becomes clad on both sides. It is not as though the homeowner has the option of deciding in 10 years to change to treated timber because the costs of repairs are going up. That is not a possibility.

- 2.3 Hitex Plastering generally completes it's work on the site long before ground works are done. In numerous instances builders, landscapers, roading and pavement contractors and homeowners simply prepare the ground levels where they see fit. In many occasions the ground levels are incorrect meaning this may cause capillary action which increases the moisture content of the framing. Homeowners simply do not understand the consequences. It is not like driving your car through a puddle. The building will take moisture in and unless a degree of robustness can be exhibited in the timber a serious personally inflicted consequence arises. The timber should have sufficient robustness that when it is wetted the gib board fails first. This way the homeowner will see and hopefully engage an expert to find out what is wrong early enough to avert a disaster.
- 2.4 Hitex Plastering Ltd has endorsed H1.2 on the basis of research done by Forest Research Institute whereby they state H1.2 will stop rot for about 5 years. Hitex does not know the performance differences between LOSP, Boric and CCA as it would be up to the treatment companies to meet the standard usefulness criteria i.e., will not rot for 5 years. This time frame will allow the steps of the leak evolving, discovering, fixing and drying before rot sets in. FRI must be directed to determine expected range of the microclimate of the wall so the level of treatment can handle 5 years of elevated moisture levels of that microclimate. The microclimate is defined in Hitex Research Bulletin 305 and is the sum of the factors influenced by temperature, humidity and vapour pressures inside the wall. Hitex proposes the timber must be kept at above 24%mc (100%rh and above) and be exposed for 5 years without rot forming for that test.
- 2.5 Hitex is concerned that LOSP is not an environmentally friendly treatment. If all timber used in building was treated to H1.2 it is alleged
- (i) That between 40 – 100 million litres of solvent will be released into the air. This has huge ramifications to the atmosphere. It is not known how that compares to the Farmers Fart tax but it should be of concern to New Zealanders.
 - (ii) The active agents in LOSP are extremely toxic. Even more toxic than CCA. LD 50 for Borates is 4500, Tributyltin Oxide 224, Tributyltin Naphthenate 224. Boric toxicity is less than a twentieth of LOSP. Figures available on request from Pesticides Trust on www.gn.apc.org Appendix 17 contains a schedule.

- (iii) Where NZ Radiata has been subject to sapstain attack before it is LOSP treated it is alleged the levels of solvent absorption can be up to 5 times as severe i.e., between 100 litres – 140 litres a cubic metre. This will be of concern to the environment and users who have to handle the treated timber as the wood cannot keep this level in suspension.
- (iv) It is understood LOSP treatment often seeps out after the timber is installed especially in warm ceiling spaces. What provisions are being put in place to stop staining and house owner's safety as the active ingredients may also leach out in those circumstances? It is understood the BIA commissioned a private report into this. The information from that report is hardly useful if BIA keep that information to themselves. What process is involved so the industry can learn from this and read the report?
- (v) What handling requirements are there for LOSP H1.2. Is OSH happy that builders do not need gloves and overalls and that saw dust and off-cuts of wood can safely be burned, left on the ground or dumped conventionally? Will builders know when to put their gloves on for LOSP and when they do not need them for borac?
- (vi) Will the mandatory standing period for LOSP be policed, as current practise is to deliver, treat and reload in either a wait for production or overnight return. This will be hard to police unless harsh penalties are imposed as no one has the room to store or the money to hold stocks.

2.6 Hitex believes Borac treatment should be returned to the market. The basis behind this reasoning is when it was introduced in the 1950's right up until the Timber Preservation Act was repealed in the late 80's very few cases of litigation concerning rot were around. Probably none. With such a successful track record it is amazing that the BIA has not gone all out to have this well tried and proven treatment returned to our houses **NOW**. The Government should encourage new Borac treatment methods so that the industry gets the timber delivered the way it wants it, i.e. kiln dried and straight.

This means it will be a post drying treatment rather than wet treatment before drying.

The FRI has done considerable work on this and the Government should immediately provide assistance to them and treatment providers to embrace the processes. This will avert the LOSP pollution. This will return the proven robustness to houses.

2.7 Hitex accepts the H1.2 treatment will not stop all rot but what it will do is

- Raise the barrier for rot to form.
- Reduce greatly the quantum of damage from simple leaks.
- Reduce the liability of the whole industry
- Reduce the time wasting that goes on defending yourself – and finger pointing.
- Restore confidence in the construction industry.

2.8 Untreated homes will devalue quickly in time as people realise these homes are high maintenance and in some cases require replacement.

This truly reflects the ultimate value of treatment. The perceived value of the homeowner and what people will pay for treatment is a reflection of homeowners balancing fear of loss to what they will ultimately pay for a sound house. State homes are doubling in prices. Untreated homes are having to be sold at Auction so homeowners can escape the transfer of liability. It does not take an academic to work out what is happening here. The Government can stop this continuing now. Surely the Government has enough facts to return to treatment now and not dilly dally around until February whilst this documentation process goes on.

2.9 Hitex is not concerned at inside walls but would offer these comments in general terms.

- (i) How and what will stop wood getting mixed up.
- (ii) Leaks form like Christmas Trees with the base of the leak the worst. Internal walls connect to the exterior walls so they will also get wet.
- (iii) Internal walls have showers, plumbing and support the roof. Internal walls are not immune to leaks because they are located at these junctions.
- (iv) Cavity construction is proposed to be useful because water can be drained out. Where ever a batten is used these are to be H3 as they will be expected to get wet. These wet battens will transfer moisture directly to the stud they are fixed to so therefore treatment is needed to the stud.
- (v) Batts make walls sweat, so too does incorrect building papers. This means at least some level of treatment is required no matter what the construction is.
- (vi) People change, fashions change. Where one cladding is popular today homeowners may choose to rip that off and replace it or simply nail another straight over the top. Buildings must be able to at least remain durable for common events such as these.
- (vii) Paints have varying permeability ratings and can affect different materials performances. Where one manufacturer of claddings may show no treatment is required the homeowner may affect that by the type of paint they unknowingly apply.
- (viii) Alterations and reshaping houses is more popular than ever. These changes mean outside walls become inside and visa versa. A wall is a wall in the minds of a homeowner.
- (ix) Hitex has had three instances already regarding wordsmithing regarding the definition of framing and treatment.
 - Carters define framing as 4 x 2. Lintels, midfloors and intertenancy walls are not exterior framing in their eyes. Probably because different mills supply the different timber and it would mean they would have to organise things differently.
 - Able pre-nailers, same deal, another job.
 - A Builder contracting to build six townhouses specified H1 as he was told by his pre-nailer that would be the new code.
(i.e. not H1+ or H1.2)
Framing needs defining
H1.2 needs defining

It is simpler to treat all the wood and hence stop all the wordsmithing and nonsense.

- 2.10 The argument regarding chipboard flooring not being treated does not support itself. Flooring is simple to replace by cutting out the affected area and replacing it. No one ever replaces what is under a bottom plate, it's just left there. Leaving it there does not affect the rest of the building. This involves little disruption or cost to repair. The only area of concern in this regard is H3 treated ply should be used under showers, toilets and wet areas instead of chipboard. H3 treated ply should be used wherever it is covered by a membrane that is hard to replace or has tiles over them. This would greatly reduce the costs of shower failure.
- 2.11 Hitex does not believe that NZ Standards, Carters, Fletchers, BRANZ or the government through the BIA will rush forward without a fight and pay for rectifying the rot that is out there, even though it is these organisations that are promoting it. That being the case then it would be negligent of the Regulatory Authorities to deny the public and builders within the sovereignty of NZ fundamental protection against rot that treatment would provide. The Government can hardly expect homeowners and builders to replace things that are defective where they are denied better practises. This miserable experiment was done outside of their control and without choice and now they are expected to pay for the muck up.

3. **E2 – Moisture Issues and RMA**

The following comments are additional to E2 General Comments as there was no reference in the consultation papers to these specific issues. The E2 description of moisture requires clarification and understanding. Currently what is happening is that E2 is being compromised because

- (i) There are no penalties for Acts that compromise E2 therefore behavioural response is to continue infringing. Without disincentives this behaviour continues and spreads.
 - e.g. install a pour flashing. Subcontractor still gets paid, as it will only start leaking when the sealant fails in 3 years. Behaviour continues
 - e.g. Architects do not do an essential detail but still gets paid. On site no one cares. Leak results. Behaviour continues.
- (ii) There is no provision for who is ultimately responsible for E2 during or after construction. This is a two edged sword as if someone was made responsible will the act give them the authority to make decisions. E.g. override bad BRANZ Appraisals to stop perpetuating the activity.
- (iii) No one in the industry has a grasp of why E2 states 18%mc as the upper limit – and is that an acceptable definition.

Hitex has recently been undertaking considerable research at the Auckland University (enclosed Research Bulletins 301-311) and from that Hitex has gained a valuable insight into what may or may not be happening in walls. The writer of this document is not skilled in engineering but offers this layman's understanding, rightly or wrongly.

- 3.1 Humans need moisture to survive. Humans have evolved and mutated over the thousands of years to be a living body that requires certain environmental conditions. We need air to breath and nourish our skin. Air has vapour that does this. We like vapour between 50 and 90% relative humidity. This means there is always moisture in the air. This moisture is both inside the house and outside the house.
- 3.2 Over the same period trees evolved that also like these relative humidity parameters. However the trees when cut down loose their natural defence mechanism to this moisture and rot can soon devour the cellulose of their structure (like human bodies decompose when we die). If we wanted to stop this decomposition we would bury the tree in water and petrify it. That way the rot would not grow, as it has no oxygen.
- 3.3 Manufacturing methods and skills have increased over the years. Now plasterboards are made in sheets, insulation materials are assembled in rolls and building papers are often formed from plastics. Exterior claddings can be pressed, cut or blown from a wide diversity of materials. All these materials are useful to man as they go into buildings to protect us from the heat, cold, wind and rain. These materials themselves have an impact on the air inside the house whether that is the air around the timber in the framing or the air in the roof spaces or under the floorboards. The combination of these materials together with the framing timber I will call “Wall Engineering” as I can find no other words to describe it. Therefore for instance a brick veneer house with a cavity, building paper, batts, wooden timber frame and gib board will have a certain “Wall Engineering” and that will be quite different to say an EIFS house or say a weatherboard house. The “Wall Engineering” allows a certain temperature and vapour differential to pass it – and remain stored in it.
- 3.4 Factors that influence the effects of “Wall Engineering” will be it’s exposure to wind, orientation to North or South, shade, colour, height, dampness of surroundings, temperature, humidity etc. All these factors will influence to some degree what we mean by E2, the Residual Moisture Accumulation within the wall. Lets call that “RMA” of the “Wall Engineering”.
- 3.5 Other factors that may influence RMA will be what goes on inside the house. The way humans live. For example it is understood that taking hot baths and showers, cooking etc increase the relative humidity within the air of the house, this affects the RMA. Humans also like to be warmer at night in winter so they provide heat to the living spaces. This elevated temperature also affects the RMA.
- 3.6 The components of the wall within the “Wall Engineering” also affects the RMA. Each material has an equilibrium moisture content (EMC) depending on the temperature and relative humidity (moisture in the air) that surrounds it. These materials are all to some degree capable of diffusing water through capillary, absorption or transfer by evaporation. When air within the wall is able to circulate this helps absorption or desorption depending on whether the material is below its EMC and can absorb more moisture or above its EMC when it will desorb by evaporation. It can therefore be understood the RMA is

going to be a constantly changing result dependent solely on the “Wall Engineering” and the effects of the environment surrounding it.

- 3.7 It is therefore expected that “Wall Engineering” will have different RMA and the rate of changes to RMA will be different for each combination of materials. They will also be different on sunny north walls and shaded south walls.

The first step therefore is that each system manufacturer needs to be able to demonstrate that the “Wall Engineering” they propose has an RMA such that

1 No mould will grow (yet to be dealt within E2-18%)

2 Insulation value maintained (dealt within H1)

3 Structurally sound (dealt within 3604)

- 3.8 The RMA will change from summer to winter. Therefore the “Wall Engineering” impact on RMA will also need.

4 Affect on seasonal changes to that particular environment the buildings are to be erected and located.

- 3.9 Adverse events will also influence “Wall Engineering” and the RMA. For example a crack in the wall cladding allowing water in will load up the vapour within the cavity (evaporating in the sun) and drive through the building paper to elevate the RMA. Therefore the “Wall Engineering” impact on RMA will also need.

5 Affect of elevated emc through adverse events will not affect #1-3 above.

- 3.10 Wall manufacturers will have to work towards reducing the effects of RMA by proposing drying mechanisms and treating the timber, batts and gib board from those effects.

Therefore what E2 should be saying is that manufacturers must demonstrate their “Wall Engineering” includes whatever it must so the anticipated RMA does not alter #1-3 above (mould, insulation and structure).

To do this manufacturers and the public must be given an understanding of what RMA is. What vapour pressure is? What drying force is available by circulating air? What does air in a cavity do? How do they demonstrate this?

- 3.11 Simply stating E2 = 18%mc is not realistic as leaks cause higher moisture levels than this. Also some cladding designs cannot meet this requirement i.e., below 18%mc.

- Where emc of wood is 17% and the temperature varies from inside the room to outside the house by 15°C condensation occurs. This is deduced from RB 310 Diffusion Chamber Research 5.3. This means if it is 5°C outside and 20°C inside condensation occurs whenever the wood has an emc of 17% or over. Therefore E2 = 18%mc has no relevance as condensation runs down the building paper and absorbs into the wood elevating the mc to above 18% - even though the emc of the wood was 17% because of condensation. So to gain some understanding I offer the following highlights from research is liquid water, moulds grow in these conditions RB 307. At 18% emc the temperature difference needed could reduce to 12°C inside to outside. Therefore at E2 = 18%mc there will be even more condensation predicted.

- Predicted emc of wood in Auckland will be 19.3% in July where it is exposed to the outside air but protected from rain RB 308 Table 1.
- These are the RMA for “Wall Engineering” of various claddings.
 - Eg EIFS fixed hard to timber without a cavity range from 15%mc on sunny walls to 18.5%mc on shaded walls. RMA = + i.e., the timber is below the July prediction therefore the wall engineering is positive and RMA = +
 - Eg FC with battened cavity 24.7%mc on shaded walls. RMA = -
 - Eg FC weatherboards 24.5% and 34.8%mc on East walls. RMA = -
 - Eg Bricks unknown.
 - Eg Hitex Diamond Cavity 10.8% - 12.8% from North to South walls. RMA = +
 - Eg MC of wood where wall has batts varies from 13-34% (20% difference) across the top of the 100/50 bottom plate. It is higher at the cladding side where it is colder and condensation is forming.
 - Eg MC of EIFS without batts varies marginally at 1% from the cladding contact face to the gib contact face. Circulating air is thought to be the difference.

All figures taken in July. As can be seen E2 = 18%mc has little bearing on what is happening in the field.

- At 14%mc mould begins. These are the black moulds that do not cause damage but are a nuisance factor. (Research Bulletin 307 Fig 2).
- At 18%mc rot-forming mould grows. (RB 307)
- At 23%mc Stachybotry grow. (RB 307)
- At 23%mc wood is generally as wet as it can get with 100% rh of the air. Higher mc’s indicate a leak or surplus water from other sources like condensation. Whilst there is some argument the 23%mc level RB 304 Fig 2 and 4 showed clearly 23% to be the cut off point. The FC wall being tested remained at 23% at its saturated state.
- “Wall Engineering” of the Hitex Diamond Cavity shows a range of positive RMA of 8.5 – 6.5% better than Auckland’s predicted 19.3%mc at this time of year. This represents a dry wall.
- “Wall Engineering” of FC with battens shows a range of negative RMA 6.7% to code indicating RMA “Wall Engineering” is incorrect. This means wet walls.

These results above can all be made available to BIA or interested parties on request.

- 3.12 In summary “Wall Engineering” studies and standards are required to ensure Residual Moisture Accumulation “RMA” does not affect the building. This is a more detailed approach so if E2 states 18% it means something i.e., the wall engineering must be such that it can keep the

mc of the wood down below condensation formation levels and prevents mould and rot forming.

In time as manufacturers prepare their RMA positive or negative values tables can be produced representing different climatic and environmental conditions and how that affects the systems RMA so correct cladding and walls can be used appropriately in different environmental conditions.

4. VM's (2.3 of E2/VM1)

The following comments are additional to the E2 – 2.3 VM comments as there was no reference in the consultation papers to these specific issues.

4.1 The VM procedure is under such a cloud it needs to take a back foot right now as it's complicating the process to move forward.

BRANZ are confused.

Manufacturers are confused.

TA and BIA are confused.

4.2 VM's should become a live piece-by-piece document. For example a cladding such as Hitex actually has a multitude of VM's to prove fitness for purpose. Some of these are

Fire	Pull through
Adhesion	Drying
Tensile	R-Value
Permeability	Abrasive
Absorption	Sea Spray
Impact	UV

None of these are included in the VM as no one has thought to include them. The above tests are more important to system durability than the proposed weathertightness test will ever be because if any of the above fails the whole cladding becomes defective.

Add onto that tests for sealant, nails, washers, PVC, resin, mesh tensile, alkali resistance and the picture emerges that holistically there are many components that are required to be correct, not just weathertightness.

4.3 The proposed weathertightness test should be pulled out of the VM at present until agreement can be reached on what exactly should be tested and how it will be tested. For example leaks originate from a number of sources namely.

- windows
- ranch sliders
- deck/wall
- handrail/wall
- roof/wall
- roof/stop end
- faceted windows
- round window
- pipe penetrations
- electrical meter boxes
- garage door openings
- baseline clearances
- pergola connection

Over the next 5 years Product Certification (PC) will be issued without complete complements of weathertightness testing. Once each generic solution is developed the manufacturer can test their products until they all get done.

It is obvious the testing laboratories doing this work will learn a lot as time goes on and the testing will become more and more efficient. If a manufacturer tests them now when only a rudimentary understanding or test method has been developed will they be released for 5 years from re-submitting to new tests as more fancy tests are created. If a laboratory comes up with multiple testing processes then good on them and that will lower the barrier for manufacturers.

What is not working at present is BRANZ have existing appraisals in the market that have not even done a 4284 of any sort. That should not be allowed. On the other hand Hitex has done the 4284 but BRANZ did not want to issue an appraisal. Even though Hitex demonstrated water did not get to the framing BRANZ say it did not comply because it did not have a batten. So what. If it worked why not make it a useful solution. There are no tests for round windows yet systems incorporate them. There are no tests for decks yet lots of houses have them. So what is happening here?

- 4.4 Generic VM's can and should be done. Once they are, they could go into the guidance documents and guidance details. The PC's will be basically following these guidance details on a minimum standard. Once that is done manufacturers can then follow suit, get the tests done in an orderly fashion and move the industry on. In the meantime treated timber will give sufficient robustness that houses will not fall down whilst the VM's are sorted out.
- 4.5 VM's will also need to cover drying and microclimate conditions so that walls, roofs, scillions and flooring will meet E2 moisture guidelines. The VM Test must be able to demonstrate compliance with E2 within the proposed environmental conditions inside and out that is planned for the building location i.e., wind, rain, cold, heat, vapour within building and movement of the structure i.e., will rigid FC system over moving timber frame be useful at all.
- 4.6 VM's must also include individual product testing so they comply within the system e.g.
 - batts do not slump, loose insulation or grow mould even if they get wet
 - gib does not grow mould even if they get wet
 - timber does not rot even if they get wet
 - claddings do not crack over timber frame construction when considering the sapwood nature of the timber the movement expected and the thermal changes of the cladding under sun and cold conditions
 - building papers do not cause condensation
- 4.7 As can be see by the above comments the VM side of the proposal papers is far from satisfactory. The VM should begin with Generic Testing and then seek manufacturer support. At present companies are spending lots of money and the VM keeps changing.
- 4.8 It will be impossible for BRANZ to issue appraisals unless they are given the correct guidance by way of total VM's.

5. Product Certificate / Appraisals / Acceptable Solutions / Alternative Solutions.

- 5.1 Acceptable Solutions should be pulled out of AS1 and used only in guidance documents showing and guiding Architects, Designers and Builders how best generically things work as *Suggested Details*. Why should the Government be liable for the building industry blunders? It is far too easy for large budget corporate campaigners to get AS1 and shed the blame to us the taxpayers. No system should be able to go to market saying it complies with AS1. Manufacturers should be encouraged to base their details on the *Suggested Details*.
- 5.2 If they become Suggested Details or guidance details AS1 could then be scrutinised regularly by BIA appointees and replaced / modified / amended / upgraded / banned accordingly as part of the management of the Act. There needs to be a determination process for this so every Architect / Designer / Builder can add to the Product Certification process.
- 5.3 Product Certification shall have a 5 year probation period were it is reviewed each year by BIA appointed organisation. Any amendments required go into the PC at the time of review so market is fully aware. After 5 years it changes to be a full PC with 3 yearly reviews, or sooner if BIA or manufacturer requests. Shall be a service fee to manage this process paid by applicant.
- 5.4 Alternate Solutions shall be for 2 years only and must be registered with BIA and given an AS number. Can be renewed for 1 extra 2 year term. Each year a review is done when annual fee is paid to keep abreast with applicant's progress into PC. If PC cannot be gained after 4 years product goes off market.
No TA can accept an Alternate Solution without a registration number, which must include a date. This will make it easier for TA's as at present manufacturers must approach every TA's and this uses lots of the TA's time and generally has different objectivity viewpoints.
- 5.5 Appraisals shall be used to assist Alternate Solutions status which then moves forward to a full PC in the next 2-4 years.
- 5.6 Any product coming through under a NZ Standard or overseas standard must go through the same process. This will prevent industry groups getting together to circumvent the PC process.
- 5.7 The Government/BIA only has to be responsible for guidance documents accuracy which themselves are not PC as there should be no Acceptable Solutions. The PC needs to be tied back to manufacturers documents for liability and the certifying organisations registration and competence. This will limit the BIA/Government for poor or biased advice or where inadequate advice is given. For example untreated timber standards committee did not consider the impact that windows, claddings or plumbing defects would have on the durability of the timber before it was introduced. Submitters were basically timber industries so only one side of the story was heard. The process of an unbalanced presentation has now made the BIA/Government liable for the losses caused by homeowners.

6. Flashings

Hitex wish to include in the BIA Consultation papers these comments on flashings.

6.1 Flashings have become a cost to houses rather than a part of the cost of a process. They have therefore been left out. What Hitex did to protect itself over the years was to include a clause in its contract that the builder and homeowner were responsible for providing flashings. Hitex did this because neither the code nor alternate solutions included these requirements, yet they were needed.

Hitex has found it difficult over the years to keep harping on about flashings when BRANZ Appraisal competitors did not need them. It is difficult to insist on a quality job when regulators allow standards to slip like that.

6.2 Homeowners have been left to buying sealant to squirt over every leak. The water is stopped so everyone thinks those products are marvellous. And so it spreads until sealants are the flashing itself. Whilst sealants do work in some cases long term they don't. Sealants are essentially elastomeric in nature so must be installed with adhesion and elasticity to function. Smearing sealant over a crack is only filling the crack, not providing an elastomeric solution, as it will crack again in a matter of months or years. Now too much reliance is placed on sealants especially as they are so easy to apply.

6.3 The consultation documents would assist if they included functional descriptions in the suggested details (not AS) for example

Head Flashings – Functional Requirements.

“The head flashing shall be made of either butynol, PVC, Plaster, Metal, Wood, Fibreglass or similar 15 year durable material and its function is to deflect water on the face of the wall to the outside of the window and prevent water migrating off the ends or the rear flange into the building. In high winds any water that enters via the flashing/window connection must remain in the window enclosure and exit via the metal undersill tray of the window. No moisture can be allowed to remain trapped in the framework of the window. Sealant is not to be used as part of this process unless the sealant also has 15 year durability”.

If each flashing had this description or a similar narrative then people could understand the process and at least Architects, builders and inspectors would be able to go back to functional requirement definitions whenever something else was proposed. Even BRANZ in their appraisals process would be assisted.

Other explanations required would include.

- pipe penetrations
- meter box penetrations
- jambs and sills of windows
- ranch slider sills
- decks to wall connections
- hand rails
- roof to wall connection
- stop ends

- guttering systems (to stop hidden and secret ones)
- junction of different claddings
- control joints
- bolt fixing through claddings
- wooden pergolas
- parapet tops
- etc

These are all generic. The description and narration given under the above functional requirements do not distinguish between brick or EIFS. The issues to be addressed are generic. These narrations need to be attached to suggested details. Drawings tend to disclose types of intended materials so should be by way of example only.

It would then be expected that specific testing at VM would be done on various cladding systems so these narratives could be updated and expanded in the normal process of BIA management of the code.

Another example would be a deck abutment to a wall.

“The deck abutment to the wall will be completed with butynol, metal, PVC, fibreglass or similar 15 year durability if easily maintained and 25 years if concealed by toppings or tiles and its function is to prevent water entry at (a) (b) (c) (d). Where the flashing is located behind the membrane (or over it) it must be able to demonstrate it can accommodate any loading of water and re-direct it back to the face of the cladding or deck. Sealant is not to be used for this process”.

See drawing in appendix 7.9.1 (1-5)

7. Battened Cavities

- 7.1 These must be removed from Acceptable Solutions (see section on Product Certification) because not enough is known about their performance to be accepted and underwritten by the Government.
- 7.2 Canadian research suggests that some battened cladding methods, particular reference given to Stucco with wooden battens, contribute to moisture uptake even without a leak. This could mean E2 = 18%mc is exceeded.
- 7.3 Canadian research (Research Bulletin 311 is a summary of MEWS 6, 7 and 8) has not demonstrated a cavity will allow a wall to dry out,” some change other than the introduction of the cavity is required to improve drying” – report from CMHC Vol 23 January 2000 Thermal Envelope at Building Science Journal, page 221 therefore cavities will need treated timber with batts and gib also treated so no mould will grow as without that change we can expect them to remain wet.
- 7.4 Hitex has inspected a wooden batten fibre cement sheet constructed house with wall insulation that has been occupied for 3 months to have a bottom plate of 24.7%mc and battens at 25.2%. This indicates that condensation is occurring, as wood will only get to 23%mc in 100% rh air. Condensation within the wall is wetting the batten and bottom plate rendering this building non-complying with the code if E2 is to include a maximum mc of wood at 18%.

- 7.5 Hitex has inspected a fibre cement weatherboard look-alike system and that had a moisture content of 24.8 – 34.2% at the bottom plate. Again this indicates condensation is occurring and these walls would also be outside the code. These walls did not have a cavity but what is not known is if it did would the result be different.
- 7.6 When a cavity is created outside air will circulate into it. This will cause several things to happen due to the connectability of the outside air and the air inside the cavity.
- (i) Cold and damp air can enter thus creating a moisture loading behind the paint skin, in the cladding and battens.
 - (ii) Hot damp air can do the same.
 - (iii) An air space results between the building paper and the cladding member. This air space will have a vapour content and be a conduit for moisture to travel from the cladding through the building paper.
 - (iv) Battens are the proposed medium for creating a cavity. If these battens are porous moisture will be directly transferred from wet claddings through to the studs.
 - (v) Battens nailed over the timber framing will reduce the ability of moisture evaporating out of the stud, as it is covered over.
 - (vi) An air space will mean a thermal loss if the cavity is connected to the outside air. This means either more insulation still or greater temperature differences resulting in even more condensation in walls.
 - (vii) Air inside the cavity will circulate. Warm air currents will work up the building and take dampness with it. In some cases cavities will inadvertently allow damp air into mid floor or roof spaces where it is not wanted. It is not known yet how much air will circulate especially with the current battened cavities being built without vents at the top of systems.
 - (viii) Air leakages will also occur at power sockets and light fittings meaning during severe pressurisation like storm or high wind unwanted spores and moulds will be blown into the house.
 - (ix) Conversely through greater air equalisation occurring more internal E3 moisture will enter the studs and batt spaces through these defects elevating the moisture content further.
- Battened cavities are far from a perfect science. North walls will behave differently from South walls or shaded walls or wind exposed walls.
- 7.7 Mitchell's building guide, the bible of many experienced builders 20 years ago doing their trade describes cavities that do not have a porous batten, yet the proposed acceptable solution does.
- 7.8 The EIFS and Fibre Cement cavities will work quite differently. And differently to brick which does not have batten at all.
- 7.9 Hitex completed in 1999 a project totalling over 100 units at Mountain View in Panmure using a 50mm batten and EIFS (Hitex). Currently damage worth an estimated \$118,000 covering a multitude of issues has occurred. Central to the issue was the intent of the cavity, which was to protect the building. This has not happened.
- 7.10 Hitex has conducted a 4284 at BRANZ with a vented EIFS system. It had 6mm deep by 14mm wide grooves spaced 100mm apart cut in the

back of the boards. The EIFS was face fixed to the timber framing. In the test when the failures were introduced (BRANZ drilled holes through the Hitex, through the aluminium window flanges and also through the head flashing) many gallons of water were pumped in behind the cladding. Only 3 drops breached the building paper. All the other water safely escaped. This test supports the Canadian research that any form of gap to allow water to run out works. It does not need to be 20mm. What is of importance here is how effective is the building paper and how does the 3 drops that got through dry out.

- 7.11 Therefore the issue of greater importance once the drainage process is established is what happens to any residual water caught up in the battens of the cavity, any water that soaks into the cladding through absorption and the water in the batts and timber if the leak breaches the building paper i.e., how does the rest of the water get out that does not drain away immediately.

The Hunn report expressly states that a cladding must allow any wet element to dry out.

North American judges are saying the same thing. Bay Point vs RML is one of the leading court cases. In the case the judge states the cladding cannot be regarded as fit for purpose if it traps water behind it that leads to degradation. I.e., wall systems must be able to defend themselves from leaks by draining and what does not drain away must be able to escape another way.

It can also be said then that if a leak comes from somewhere other than a leak through the cladding, like a window mitre, a water pipe, an internal gutter, a shower etc., it must also be able to drain or dry out. The timber will get wet from these other sources which will be unable to escape by drainage, as it will not necessarily be draining into the cavity. The cladding by definition is the only place that water can drain out. It will not be acceptable trying to drain it out through the living room walls.

- 7.12 Drying capability or at least the ability of a wall to reduce its moisture to within E2 is therefore as critical, if not more critical than drainage by itself. This is because drainage works easily by gravity. Drying does not. It is here that Hitex has the greatest concern. The current Act under E2 specifically includes this requirement. The Authors of the NZBC predicted this at the time i.e., Buildings must be kept dry. What has happened is the NZBC has not been managed correctly as it has allowed systems to be used that have no drying mechanism and are therefore not fit for purpose.

- 7.13 Hitex has done extensive research into this issue in association with the Auckland University. Hitex Diamond EIFS has been demonstrated to dry out walls simply by the design of the cavity and by design of the transport mechanism to take the moisture away once it diffuses (or wicks) through the building paper. It can be done quite easily. Hitex Diamond Cavity and the Research Bulletins (RB 301-311) can be seen on www.hitex.co.nz Hard copies are enclosed. Research is continuing.

- 7.14 Hitex has installed 30 house lots of Diamond Cavity and has begun a measurement program of the actual mc contents of the bottom plate. They range from 10.8 to 12.7 3 months after the gib board is put on.

- These mc figures demonstrate good dry timber. The measurements were taken in the winter months of July. This is a significant drop from the +20%mc normally experienced at the bottom plate at pre-line.
- 7.15 Hitex has had the Diamond Cavity R-Value measured and through the patented design of the cavity very little R-Value has been lost. A small increase in the thickness of polystyrene was all that was required.
- 7.16 Hitex has completed the water draining test similar to the Canadian model proposed i.e., it is possible to design and engineer a cavity system to work.
- 7.17 A poorly designed cavity may allow air equalisation to occur at window openings and penetrations where gaps are. This will cause leaks around windows to increase, as more water will be driven in. This will to a degree be handled by the cavity however this may mean for some cavity designs the wall will be continually experiencing significant wetting periods. This means it will be even more important that any water that does not immediately drain away can somehow escape through some drying mechanism whatever that will be.
- 7.18 A cladding can only be fit for purpose if it can drain and dry a wall out. Nothing else can so it is left to the cladding.
- It is premature to suggest a wooden battened cavity with the walls filled with batts and a cold non-thermal cladding fixed over it will work at all. The Canadian research, the Hitex research and the field measurements taken suggest the opposite to be the case. Why then is the BIA proposing to make this an Acceptable Solution at this stage? Surely for the sake of liability caution would prevail. Treating the timber will only delay the rot where the moisture content exceeds 23% and with LOSP treatment the timber is likely to rot sooner rather than later than CCA.
- It is nonsensical to suggest the timber batten must be treated to H3 but the framing it is nailed to is not. The industry would be expecting too much of the building paper to stop that level of moisture in the wooden battens from getting through to the framework and batts. Even if the timber was treated is the BIA also proposing to treat gib and batts. They are both well above mould and stachybotry formations. See Hitex Research Bulletin 307.
- 7.19 BRANZ has stated they have enough information from the Canadians to categorically state battened cavities **WORK**. Where is this evidence? Will it be made available to the public or for that matter the TA's who will be liable for issuing permits and to the manufacturers who have to warrant it?

8. Drawings

Hitex submission includes the drawings given to Adrian Bennett at the EIFS group and BIA meeting. Further copies are included in Appendix 17. Hitex expects the drawings to be part of public record of this document. Hitex also says.

- 8.1 Drawings within the NZBC and Act must be suggested details only. They should not form part of Acceptable Solutions as by doing that the BIA becomes liable for them.

- 8.2 Drawings should be included in a process of continual improvement. There should be a process of submission of generic drawings with an attached “functional requirements” narrative so people understand the function rather than blindly following a drawing.
- 8.3 The number of drawings required to fully understanding a simple deck maybe as high as 30 see drawing 7.9.1 (1-5). Therefore it is a process of function rather than produce 30 drawings. If the BIA proposes to include AS drawings then it must provide all 30 for decks otherwise architects will limit their drawings simply to the ones included in the AS so they are not liable themselves. If it is okay for BIA to restrict to one drawing it will be okay for the architects to do so as well.
- 8.4 The BIA needs to define on buildings, which drawings are essential and which are not essential. The essential ones should then be prescribed to be part of the permit process. For example Winstones provide excellent drawings for all their products. Architects simply click onto Winstones whole book and go print. 100 details straight away even if the building is only using 10 of them. No matter it is better to have more than enough. Some of these affect bracing but the rest are Winstones contribution to building practises and well done, but not important to RMA (Residual Moisture Accumulation). When it comes to an outside deck builders are lucky to even find a drawing. There is no 100 to click onto because Winstones do not make deck products. Architects are not paid to decide on all materials, trims, type of tiles, etc so they leave them out. Many designers and drawers of plans are not even aware of products or how they go together. They are not paid to research out where or how a drawing will even look like, let alone work on site. These are the critical ones and cannot be left out. The BIA needs to stiffen up in this regard and assist TA’s nationally (and Certifiers) on what are the basic and necessary drawings. Not only a cross section of a deck, but where the deck meets the wall etc etc., - not to guarantee their performance – merely ensure a practise is laid down so it can be followed. Too often we expect a tradesman builder to sort out everything. Many builders do not even have the training we expect the to have. Many builders are told to stuff off when they question what they see is poor methods.
- 8.5 Hitex could provide assistance in this regard.
- 8.6 Plans for permits are becoming more wieldy. Specifications for a commercial buildings being constructed for Hitex include 25mm thick of papers (many are Winstones). But certainly enough for a standoff belief that enough is enough. What type of record storage is envisaged over the next 10 years if each building permit produces 30mm thick of drawings and specifications per building? A quick calculation is 10 years at 22000 plus 20,000 alterations at 30mm thick equals 12.6 kilometres high. Look out sky tower. Surely this whole process could be simplified without the TA’s becoming liable if they forgot to ask for one detail or page or if an architect failed to photocopy it correctly because it jammed in the Xerox.
- 8.7 Somewhere there needs to be a balance of providing guidance and limiting the exposure of TA’s and the cost of putting architects to unnecessary work. Correct direction may actually involve cost

benefits, rather than going all out for 50mm thick of paperwork which could well be the case if more regulation equals more paperwork.

9. Code of Compliance / B2 E2 etc

Hitex wish to include in the BIA consultation papers these comments on Code of Compliance Certificates.

- 9.1 Code of Compliance Certificates stands.
- 9.2 The Code of compliance needs to have as attached the PC numbers and AS numbers as part of its contents.
- 9.3 Code of Compliance Certificate ends when buildings are signed off. This is inadequate as this needs extending so they should be renewed each year with TA and forms part of a new rating within the TA. i.e. Add \$100 or \$200 onto the rates so building is registered with the TA each year like a car registration.
- 9.4 Each 2 years a ‘Building Warrant of Fitness’ should be produced by the homeowner for continuance of registration. The following inspections should be carried out by a registered building official and the record retained with the building for life.
 - 2 years Envelope (E) inspection and (Maintenance) M carried out
 - (+2) 4 years E.M.
 - (+2) 6 years E.M. and Plumbing (P) inspection
 - (+2) 8 years E.M.P. and Electrical inspection
 - (+2) 10 years E.M.P.E. and Structural review
 - 20 years E.M.P.E. and Structural review
 - 30 years E.M.P.E. and Structural review
 - 40 years E.M.P.E. and Structural review
 - 50 years E.M.P.E. and Structural review

The effect of this requirement is that builders would become focused on the future performance of the building to keep their good name rather than just getting through the issue of Code of Compliance Certificate as they walk off the job. For example, how many Car Manufacturers would survive if they only had to be responsible for getting the car off the lot - and not worry about how it works one month after sale. That would be good on day one but the market would soon know who to buy off the next time.

- 9.5 When a building is sold it should have an E.P.E.M. within 3 months of sale and the history of inspection must be included with the sale documents. This would limit hidden liabilities being passed off.
- 9.6 If a building owner refuses to register the building or to conduct the ‘Warrant of Fitness’ the owner would then legally be assuming liability for any consequential damage or health issue.
- 9.7 The TA should be given the power that if the owner fails to conduct two consecutive inspections, to order an inspection. Failure to comply will result in eviction and loss of power and amenities to it. i.e. take the motor vehicle off the road. For further or continuing refusals there should be a fining process until the house is confiscated.

- 9.8 The effect of this proposal is whole of life cost benefit for our housing stock. If regular inspections are undertaken and regular maintenance is conducted major problems will be averted. The motor vehicle industry works in a similar manner primarily for the safety of the cars occupants and other road users. Houses need the same as when they are resold hidden treasures will be limited or noted on inspection papers. It would be doubtful if major reconstruction would be needed if things got fixed in time. Wetness and dampness which do cause health issues will have to be attended to – or at least the new owners would be under caveat emptor and not blame TA, B.I.A. or builders etc for their misfortune. The greatest benefit will be that owners who look after their homes will have retained capital value and those that don't will loose value. This will be especially important to landlords and the conditions they often subject tenants to.

10. B2 – What is it?

Hitex wish to include in the BIA consultation papers these comments on B2 durability.

B2 is contained within the code as very simplistic wording. But what does it mean? Who is going to interpret and who is going to have the final say?

- 10.1 To some wordsmiths like timber suppliers B2 50 years means if the timber is kept dry it will last 50 years. B2 does not actually have or contain that proviso i.e., if kept dry. However the proponents of untreated timber must have convinced a number of people the proviso exists otherwise NZ Standards and BRANZ would not have had a bar of it. Just because E2 says it should does not mean the building will keep dry.

- 10.2 None the less it's happened so what needs to happen now is the B.I.A. needs to review this interpretation to stop the word smithing.

- 10.3 It is known that B2 5 years includes paints and sealants, which are likely to need repair within 5 years. What happens if the paint or sealant was wrong or done wrong at application. What happens if it broke down before 5 years or brakes down after 5 years and wasn't attended to. The B2 50 year products rot and do not continue to meet the code.

Therefore the whole description of the current B2 is rather meaningless as all products are relying on the weakest link i.e., 5 years.

- 10.4 Surely then what the B2 statement is actually trying to say is 'Even if the B2 5 year (lesser period) fails it should still not affect the B2 50 year (longer period) performance'. Leaks and failing products are foreseeable and in essence planned for in these staged durability provisions. Therefore what has gone wrong here is people have simply failed to correctly interpret the Act. A B2 50 year product must be expected to remain durable as by definition it is being protected by a B2 5 year product that knowingly will fail in a time span less than the 50 years of the other products.

- 10.5 Similarly a cladding has B2 15 year. Cedar, weatherside and stick on bricks were products that needed replacing either before or at 15 years. Other claddings may be the same. Was the cladding done right in the

first place, did flashings last the distance, was the B2 5 year paint replaced 2 times at the correct time and to the correct specifications to keep the B2 15 year cladding dry and is the cladding itself cracking a letting water in. All these events mean either a temporary failure to keep water out so what is B2 50 year really mean.

- 10.6 ‘Even if the B2 5 year (lesser Period) fails it should not affect the B2 15 year (different period) which if it failed or was affected by the failure of the lesser one will not affect the B2 50 year (longer period) products’.
- 10.7 This argument would need some rationalising, as by that definition for fear of B2 50 year failure we’d be treating to H5. The Code has a proviso regarding maintenance but this must include R.M.A. (Residual Moisture Accumulation) limits (i.e., within a defined microclimate that avoids decay RB 305 and RB 307)
- 10.8 That is why Hitex supports H1.2 as it is lead to believe that leaks will be identified within the 5 year (especially if Building Warrant of Fitness checks were introduced), action taken to fix them and R.M.A. goes back to acceptable limits so B2 50 years remains at least a possibility. At present with untreated timber there is no probability that B2 50 years will be achievable. At least half the buildings will leak and fail.

11. Liability Issues.

Hitex wish to include in the BIA Consultation papers these comments on liability issues.

- 11.1 The BIA clearly states it is liable if an acceptable solution is used that is wrong.
- 11.2 Accordingly manufacturers have warranties that state when things go wrong what are the consequences.
- 11.3 The professional bodies of Architects and engineers also have similar guarantees.
- 11.4 Thus on the surface it’s a straight forward issue. However that’s not what is going on in the market place. Why are Territorial Authorities found liable? They didn’t write the act, didn’t draw the drawings nor make the goods that go onto the walls. Yet courts find them up to 40% culpable.
- 11.5 The Act needs broadening to give guidance to the Courts and Adjudicators and Arbitrators who are left with the tedious task of sorting out this mess.
For example, in these consultation papers on page 88 an attempt is made to make designers liable for mould. For this to mean anything, microclimates, R.M.A., wall engineering and liability including penalties must be known, implemented and followed. Statements on page 88 do not install confidence on an industry – it installs defensive mechanisms on people.
- 11.6 For example if the code continues with Acceptable Solutions there needs to be a process where affected homeowners can go to recover money when things go wrong – same for Appraisals. If an appraisal like untreated timber is allowed to be issued to the market then there should be a process the public can go to sort it out – within the

provisions of the Building Act not the courts. This would stiffen up the Appraisal process so it meant something – and the Acceptable Solutions as well.

- 11.7 For example, how can a book be produced called “Good Stucco Practice” that includes Stucco fixed directly to framing. How can the Stucco standard even have been done? One would expect therefore that those publications will underwrite any costs associated with problems in that regard. But that’s not what is happening. The W.H.R.S. is designed to defeat that very process by trying to find the builder – who followed the standard – liable.
- 11.8 If the B.I.A. says this concept is outside of the scope of these documents then think of it as the B.I.A. is the pinnacle of the building industry – you are our voice at government. The very reason we have phoenix companies is that those developers are simply shrewd enough to realise the liability “means them” so they go from shell to shell to protect themselves. That’s a sure indication the act is not working. Making some dressage points like suggesting we double the inspections does not do one fundamental thing to this whole saga. For instance the income tax laws have heavy penalties. Not paying tax can incur a penalty of up to 3 times the amount avoided. Imagine how Taradale and a few of these other Phoenix companies would react to that. Imagine how appraisal issuers would react to that. Three times the cost of a house as penalty if it’s R.M.A. was exceeded. That would quickly sort out the issues. Would Carters be so keen to dump untreated timber and hide behind a Standard if the Standard and Carters were given a fine – for every instance of breach – of 3 times the amount? Executives of these companies would probably make different decisions under these circumstances.
- 11.9 What is happening is homeowners are not protected. They are being exploited and lose considerable equity in their houses when problems arise. New Zealand needs to improve net wealth and continue consumer spending, not waste money fighting legal battles, which Corporates with more money will win or delay. Apart from treat the timber this is the other saddest thing coming out of this disaster. Homeowners are being stiffed. The builders are being stiffed, yet they had nothing to do with defective building designs and defective building materials.

Hitex requests the B.I.A., on the industry and consumers behalf, address the liability issues and introduce sufficient penalties so the riffraff will go – and that includes the proponents of standards and appraisals who do not fully consider the ramifications of what they are doing.

For example there are enough provisions in the existing Act to ensure buildings are kept dry yet there has been no mention of the drying mechanism in any of the BRANZ appraisals issued to date or for that matter these documents. This is a warning to the BIA not to allow cavities becoming an “Acceptable Solutions Status” until more is known. Will the BIA underwrite yet another problem when they are already denying liability for the last muck up.

12. Producer Statements

Hitex wish to include in the BIA Consultation papers these comments in relation to Producer Statements.

- 12.1 TA's are very concerned about their liability at present. In general TA's are being found guilty of neglecting to carry out adequate inspections and collecting the necessary information.
- 12.2 There are in all probability 200 odd manufactured products in the market relating to weathertight issues. The courts expect the TA's and Certifier's to be able to understand and identify each of these products, how to inspect, and when to inspect them, to issue stop work instructions and have these ugly scenes with the homeowner and builder when they get pissed off, and still raise a family. I think not.
- 12.3 The provision of Producer Statements needs to be revamped. These need to become "statements from the Producer". These statements need to be clear and include the following. They should be needed to get alternative solution status.
 - (i) What inspections are required of the TA they themselves are not prepared to inspect, or that they want the TA to inspect and be liable for. An example is included in Hitex Information Bulletin 2003/18 Ten Simple Checks for Hitex Plaster Claddings.
 - (ii) What how and when to conduct that inspection so that they can see at the correct time in the construction of the house its done right. This step may involve some products incurring additional inspection costs, which will reflect in the permit costs and total costs of the project.
 - (iii) What the TA's or inspectors should do and the support they will get from the manufacturers if they do stop the job when things are not right.
 - (iv) A list from the manufacturer of who is competent to do the job. That person/people must be prepared to sign on behalf of the manufacturer, they did the job correctly.
 - (v) What documentation the TA's will get to support B2, E2, H1 etc and who is signing on behalf of the manufacturer. An example of that document is included as "Hitex Works Compliance Certificate" in Appendix 17.
- 12.4 A statement from the manufacturer of what literature or expert they are relying on at the time the job is done. This could be like an appraisal.

13. Ground Clearance Tables

Hitex seeks the BIA consider establishing once and for all a table to attach to the code stating acceptable ground clearances.

- 13.1 Ground levels are often done at the end of a job. Invariably no one wants to dig out dirt so levels get too high.
- 13.2 Gardens are formed by adding soil. Generally people raise the gardens so water does not run off concreted areas and rot the roots of plants. By adding soil ground levels are raised all after the builder and cladder are finished.
- 13.3 Landscapers know little about the building act and some know nothing about which particular cladding went onto the house. Cavities will be

an even greater disaster with high ground levels as dampness will go straight in.

- 13.4 Homeowners know enough to say they do not like the ugly step where the cladding laps over the concrete floor. They instruct to lift the soil to hide it.
- 13.5 Plasterers and some cladding manufacturers see the need to plug up the gap between the base of the cladding and the ground as that's what the public want. There are no fines so this is seen as good behaviour as they get the sale in preference to a plasterer doing it correctly.
- 13.6 Future homeowners will simply add more soil when the old soil looks like it needs manuring, meaning clearances will minimise further.
- 13.7 Concrete layers want to style their concrete and free from entrance ways especially around garages, ranch sliders and entrance doors. The code is something others read. They are on the outside of the building and form no part in building the house. Hitex would predict 3 in 4 houses have incorrect height concrete driveways.
- 13.8 Roofing companies want to hide their flashings to gain a market edge. Basic things are being trampled on. Basic things like deflecting water and stopping moisture accumulating.
- 13.9 Hitex propose a table of clearances at baselines be produced for each cladding type and this would include
- Cladding to wet ground, concrete, tiles, grass, decks.
 - Cladding to roofs, flashings, aprons, gutters.
 - Cladding to membranes
 - Cladding to inside of parapets to roof
 - Cladding junction to other types of cladding where horizontal lapping is envisaged.
- 13.10 This table should be constructed over the next year following manufacturers being requested for comment. That comment should require manufacturers to submit no less than 10 houses they have constructed showing moisture contents of bottom plates to the various terminations they propose. For example Hitex has always stated 50mm clearance to tiles for no other reason than that is what looks reasonable. Hitex measured a 7 year old Hitex house at the deck in July and the mc was 13.5 and the deck only had 10mm clearance under the Hitex. On a wall adjacent where there was 200mm clearance the mc was 12.9. This was only a 0.6%mc difference. Both were well within code E2 at 18%. Does that mean Hitex's 50mm was conservative. The manufacturers also must state whether there is a difference between South and North or windy situations. These should be independently verified.
- 13.11 Deck clearances are important on a building. By stating these need to be say 100mm adds significantly to the complexity and design of the house to accommodate such a dimensional difference (due to beam size) especially where decks fit over ceiling spaces. Caution is advised before making radical changes that are not supported by the facts e.g., Hitex 10mm clearance. Surely the gaps must be gaps that demonstrate acceptable moisture readings, not some hypothetical guess.

14. Transparency

Hitex wish to include in the BIA Consultation papers these comments on Transparency.

- 14.1 The Act has no provisions for the BIA to demonstrate leadership and guidance to Architects, Builders and Territorial Authorities or if it does it is not following them. These statements relate to building failures.
- 14.2 It is alleged by BRANZ they hold 10,000 reports from their franchised network of BRANZ Accredited advisors. These reports contain significant information homeowners should have access to. Homeowners have been left with no alternative but to instruct and pay for professional advice probably because neither the builder, architect, manufacturer nor owner had the knowledge themselves. These BRANZ reports are probably fairly indicative of failures and problems buildings have. Hitex is concerned that this information has not being communicated to the practitioners in the building industry. BRANZ has considerable influence over the industry and has the power to influence Territorial Authorities, builders, architects and homeowners through the appraisal and advisory services. It is questioned whether this information was material and pertinent to future building methods and existing buildings failures.
- 14.3 Would an architect accept an appraisal if he knew there were say 1000 BRANZ reports showing failures of that product carrying an appraisal. I think not. However the architect has no method of finding out about those failures because they are the exclusive to the domain of BRANZ and its network of franchised advisors. BRANZ have therefore taken a large risk in denying disclosure in the public interest.
- 14.4 The BIA must take over the role of receiving documented failures and registering them on a framework so interested people can see for themselves what is going on. Designers and the public need all the facts before they chose to use a product in a certain way. Why is it that the New Zealand Herald and Target program is where the industry got told of all the problems when BRANZ is there receiving them. People do not pay money for decks if they know it would fail, they are not that stupid.
- 14.5 Transparency is therefore required. BRANZ does not appear to be demonstrating it has the ability or desire to correctly advise the industry. Whilst this is the writer's own opinion events will follow through the courts whereby this will be determined. If those reports were significant and architect and designers could have avoided these the behaviour of BRANZ will be known.
- 14.6 Whilst it may seem damaging to the industry to know what is wrong with it very few doctors make prescriptions unless they know both the sickness and the remedy. With the outbreak of SARS people's awareness was to stop travelling so the disease could be contained. With the building industry the disease is not yet some doctors (regulators) cannot see the remedy or the cause. Timber rots because it is not treated. If the 10,000 reports BRANZ alleged they have are cases of building sickness then the manufacturers, builders, architects, TA's and contractors could have been learning from it since these reports have been stockpiling.

- 14.7 Hitex seeks the BIA be given the power to introduce a mechanisms for full disclosure of previous problems. This way solutions will be found quicker. Designers can avoid products that have problems.
- 14.8 Stuff the confidentiality provisions. We need solutions not secrets. The public interest is surely far greater than the confidentiality requirement of single organisations..

15. B2 / AS1 General Comments.

Where no specific section is included in this submission on a particular topic the following comments are offered in reference to the remaining Consultation papers submitted.

15.1 **B2/AS1 Table 1**

Under Protective Coatings there is a category for difficult to access or replace. Under roofing, which is where membrane roofing is categorised, there is no such definition. It would be envisaged that tiles, toppings or screeds applied over the membrane would make it difficult to access or replace the membrane and consequentially should be afforded the same durability provisions.

15.2 **B2/AS1 3.1.1**

These consultation papers are designed to provide information so people can make informed decisions. Boron was always known to reduce and prevent rot. To suggest it was for borer only is not correct.

15.3 **B2/AS1 4.1 Timber framing and Weathertightness**

There has always been a problem of weathertightness in NZ homes. This is not a new issue. Buildings did not suddenly begin to leak. Even the claddings survey commissioned by BIA said one half of 10 year old houses leak.

BRANZ have offered the following statistics from a sample of the 10,000 investigations into leaks from their library

Windows and doors	23%
Roofs	19%
Claddings	19%
Clearance problems	9%
Other penetrations	5%
Dissimilar materials	5%
Parapets	4%
Pergolas	1%

It is incorrect to state claddings are the major source of leaks.

With 10,000 investigations it is also incorrect to say this problem suddenly emerged. 10,000 reports cannot be written in a day. Hitex understands four (approximately) of these reports relate to Hitex investigations. Hitex has undertaken approximately 200 maintenance calls on its houses due to leaks or problems. That means 50 times as many issues are out there than is represented in these BRANZ reports i.e., up to 500,000. Nothing in that statistic even remotely suggest this is a sudden and unforeseen issue – rather the opposite would be true and it is incorrect of BIA to suggest otherwise.

Hitex include in its submission in Appendix 17 information given to the Minister Hon George Hawkins in Hitex’s submissions concerning treatment requirements in houses. Enclosed is a copy headed 1 Hitex

Experiences and 2 Likelihood of Success of Changing Building Practises. Whilst this information is sensitive to Hitex we believe it is in the public interest to see for themselves the incidence of failure is not what the papers or BIA lead us to believe.

- 15.4 **B2 AS1 4.3 Identification of Timber Treatment**
It is common practise for kiln drying companies to die timber pink giving people a false impression the timber is treated like the old Boric or even worse that they have put something in it (like treatment) when none at all was used. An example of this is when untreated timber was launched as ‘Chemically free treated timber’. Kiln drying is a process. It is not a treatment and never will be.
During 2003 the BIA commissioned a report on LOSP regarding environmental and performance issues. Where is that report? The report should have been included in these documents so people could be informed on LOSP’s level of pollution and the effect it will have on the environment and people.
- 15.5 **B2 / AS1 5.1.1 Treatment for framing in housing.**
Hitex votes for treatment of all framing. The definitions on H1.2 regarding framing needs to also include lintels, joists, beams, bracing etc as wordsmiths will be sure to make their own interpretations. For a full explanation and background information refer to section 2 of this paper. .
- 15.6 **B2 / AS1 Table 1 Proposed hazard class definitions**
This table needs to also refer to DZ 3602 tables. The DZ 3602 proposed tables are confusing. For example Table 1 D includes many references that are similar in intent to these papers regarding treatment levels but Table 1 E states untreated timber where a cavity is used (bricks). Either timber is to be treated or not. Why so many different tables. Things are complicated enough. See comments in section 2 of this document.
- 15.7 **B2 / AS1 6.0 Alternative Option Considered.**
Hitex votes against this option. It would be acknowledged if changes to the building methods improved so leaks could not happen and the RMA was okay for untreated timber then review when that happens. No one wants treatment for the sake of it. We want it to keep buildings safe. But can we actually build a house that never leaks or will never be subject to elevated moisture levels – we are not in the Sahara Desert.
- 15.8 **B2 / AS1 7.2 Impact on the Douglas Fir Industry**
The purpose of the Building Act and NZBC is to provide safe and durable houses. It should not necessarily be bound up in red tape that common sense would not prevail. If the Product Certification process existed and if Douglas Fir industry could put up a good case that leaks do not cause the same issues as are found with NZ Radiata then let them give it their best shot. After 3-5 years review it. If Douglas Fir has got that many houses already surely they could do a survey and convince the BIA of the merits they seek.
- 15.9 **B2 / AS1 Appendix One 1.0 Background**
The Authors of this appendix is questioned regarding these statements. The Appendix leaves a reader firmly of the view that

- (i) Reports were not received before the late 1990's regarding weathertight issues. Hitex Plastering attended at least two seminars held by BRANZ whereby BRANZ were communicating the alarming problems with weathertightness. Roofing companies, Window companies and Cladding companies attended. The dates 1995 and 1997 from memory.
- (ii) BRANZ claims to have 10,000 reports from BRANZ Accredited advisors. The dates of these will show whether reports came **filtering** or **flooding** in.
- (iii) Before BRANZ accredited advisors BRANZ had field staff. In Auckland I believe they had 5 or 6. Mr Bill Irvine of BRANZ in Auckland meet me on a job as early as 1992 regarding leaks. At that time Mr Irvine stated he did a report and BRANZ got a copy of that sent to them. BRANZ will also have a library of these.
- (iv) NZ has many house inspection and repair companies whose business depends on leaks and problems with houses. To exist they need leaks. Have these people been consulted.
- (v) Hitex has a register of leaks as other companies probably do. Have these sources been consulted.

What has been omitted is leaks always happen. The lowering of the timber durability through a reduction in timber quality (heartwood to sapwood) and a reduction in treatment from Boron (in 1955-1987) to H1 Boron (1992-1998) to H1 LOSP (1992- current) to zero (untreated 1996-current) has meant the problem of rot has exponentially accelerated. Where once a house (treated with Boron 1955-1987) that leaked for 10 years remained sound now a house that leaks for a matter of a year or so may be condemned, as the rot is so extensive it may not be repairable. Even where H1 Boron (1992-1998) was used these houses exhibited some robustness but succumbed in 4-10 years to prolonged leakages.

15.10 **B2 / AS1 Appendix One 1.0 Background**

The Hunn report mentioned many things. One such reference was that the design of buildings should be able to dry out any wet element. This was a simple statement made by Hunn reinforcing what the Building Code in E2 actually stipulates. These BIA consultation papers fail to discuss or offer debate on this very important aspect. We know water gets in therefore we must find out how to get it out before damage occurs. Even with treated timber unnecessary water must be discouraged and dried out.

15.11 **B2 / AS1 Appendix One 2.2 Treatment of Timber**

It is pleasing to read the BIA has made statements like "Untreated timber does not have the same track record". Acknowledgements of this sort are gratifying when solutions are sought by interested industry parties.

15.12 **B2 / AS1 Appendix One 4.1.1 Status Quo**

Commentary specifically mentions cladding systems failing and leaks occurring. It is conceivable and more than likely to be demonstrated that some cladding assemblies actually contribute to moisture uptake, without a leak. Carters and Fletchers have systematically prevented or/and restricted the availability of treated timber so builders had no-

where to go. I personally can attest to that when I did my alterations to my house and recently built a factory. Treated timber was hardly an option as it is neither stocked or discussed. A house needs many sizes of timber so it is an all or nothing approach.

15.13 **B2 / AS1 Appendix One 4./2 Treatment of Timber**

Allowing TA's to approve untreated timber is not a useful option. TA's could be run by environmentalists believing they are doing good and this may inadvertently affect the general public. Hitex does not support this option.

15.14 **B2 / AS1 Appendix One 4.1.3 Alternative option**

Hitex do not support this proposal. This would involve litigation and argument when things fail.

15.15 **B2 / AS1 Appendix One 5.3.3 Statement of Benefits – Wider Community**

The following additional thoughts are offered

- (i) Cost of creating the cavity not addressed.
- (ii) The argument of sustainable cities, re-usable timber and the value or future worth of the housing stock are not addressed.
- (iii) When all merchants begin producing H1.2 competition will reduce the total increased costs below \$55 /m³ that is currently being quoted.
- (iv) A large cost to the NZ nation is the potential loss of credibility of our timber exporters. When overseas markets learn of NZ's blunder they may shy away from NZ Radiata Pine. What cost does the nation face when our overseas trading partners learn of this.
- (v) Shower leaks are Hitex clients largest single repair cost, even greater than exterior wall problems. These costs have not been addressed.

15.16 **B2 / AS1 Appendix One 7.1 Compliance Costs**

Hitex foresees large compliance costs in

- (i) Lobbying the BIA to make the changes
- (ii) Testing to prove to BIA changes are necessary
- (iii) BRANZ appraisals as everyone is so cautious now. Manufacturers are being asked to spend large sums for tests like VM1 that do not solve much, see VM section 4 of this document.
- (iv) BIA staff gets paid to do this. I do not. I work long hours for my business and now I have got this work to do as well. All that happens is people become distrustful and resentful. This affects my health and the profitability (and company tax) of my company.

15.17 **B2 / AS1 Appendix One 7.2 Compliance Costs**

Hitex estimate it has spent over \$100,000 so far preparing, testing, building prototypes, building equipment, new literature, legal advice, other professional advice, travel etc without management time. This is discouraging when the bottom line is people have not been doing their job and then misleading the public to divert the attention away from useless timber.

15.18 **B2 / AS1 Appendix One 7.7 Steps Taken**

Yes most definitely there are steps to be taken.

- (i) Cavities for some claddings will need extensive engineering to reduce moisture accumulation. Without that research an even greater disaster may happen. See section 7 of these papers.
- (ii) Batts and gib board cannot handle the leaks. Research needs to be done on these products if they are to continue being used in walls.
- (iii) Work must be done on drying mechanisms and how to engineer these into walls. It is pointless just treating to delay the inevitable. We know water gets in. We must now find out how to get that water out before damage is caused.
- (iv) LOSP is a potential time bomb. Will research be done and fart taxes be imposed. Will limitations be placed onto the use of Tin? Is it really effective, as H3 LOSP has not worked?

16. E2 General Comment

Included in section 3 of this paper are E2 issues not covered by these consultation papers. Please refer also to section 3 E2 – Moisture Issues and RMA.

16.1 E2 Glossary Building Wrap

The definition is not achievable on buildings. The commentary “Condensation or Moisture behind the cladding system is directed to the exterior of the building” is not achievable on certain types of cladding. Cold claddings such as FC and metal will during the hot day potentially cause condensation to occur on the gib board and in the evening condensation on the inside of the building paper. Neither of these situations achieves the definition provided. The building paper is there to absorb some moisture and act as a filter to prevent undue moisture permeating through from the outside and to assist the reduction of air leakage affects of pressurisation.

16.2 E2 Glossary Drainage Plan

There are several universally accepted methods of describing different wall designs. For example open rain screens, drainage planes, ventilated systems and drained and ventilated systems. There are probably others. All have cavities of some description but not all are ventilated. Some work with ventilation (Brick) some work better without (Hitex Diamond Cavity according to Hitex research). The explanations given in the papers is insufficiently descriptive.

16.3 E2 2.3 Verification Method (E2/VM1)

Included in section 4 of this paper are E2/VM1 issues not covered by these consultation papers. Please refer to section 4 – VM’s (2.3 of E2/VM1)

“The proposed VM shall be limited to cladding systems installed over a drained and ventilated cavity”. This description is unsound as a cavity can be any ‘hole or hollow in a solid object’ yet a ventilated cavity must be a ‘hole or hollow that provides with or circulates fresh air”

Firstly EIFS work better without circulating fresh air.

Secondly the size of the cavity which although not defined here is set at 20mm. No research has been done on EIFS to see if these work.

The Canadians have not tested such a combination. Neither has the Hitex Drying Project.

Thirdly some cavity systems like Stucco contribute to moisture uptake because the air circulating brings in damp air causing moisture increases. What are the true facts about battened FC systems.

“The main reason for this is that the science needed to quantify drying rates is not yet advanced enough to enable a VM to quantify drying rates without lengthy experiments”.

This is simply incorrect. Hitex has over the past 8 months quantified its drying rates and understood its drying mechanism. Other manufacturers have not bothered. That is no excuse for not trying. There should be a strong emphasis here to the manufacturers that they will have to comply with the recommendations of the Hunn report and meet the requirements of the Building Code E2 which already states this. In the meantime it is incorrect to simply advocate for methods that are not proven and that can in some cases cause water accumulation and even more serious problems in walls, especially to batts and gib board.

16.4 E2 2.4 Acceptable Solution Weathertight Risk Evaluation

It is understood why the proposal is included that high-risk buildings include a cavity. What is not understood is why other buildings do not. For example walls are failing because water is trapped between two skins, gib and cladding. Therefore by definition such a practise is prone to failure i.e., a high risk. Where walls are constructed without the internal lining water cannot be trapped as it simply evaporates hence low risk. Hitex have understood this and described two types of solutions. Naturally Aspiring for unlined walls (i.e., no gib) as moisture can evaporate directly into the air and cavity for all other lined walls. See Hitex Information Bulletin 2003/13).

It is equally understood that faceted windows that are prone to failure will fail on one storey as easily as two. It is equally understood that single storey buildings will still have windows, guttering systems that may be installed in the soffit, plumbing and showers.

It is acknowledged the single storey building will not have the same number of complexities but that does make it by definition a safer house compared to a high-risk house.

Hitex propose that all lined walls are high risk and require a cavity and unlined walls do not as the timber can dry out naturally. Walls without gib board should not have a cavity as there will be nothing to stop wind blowing directly in.

16.5 E2 Proposed Amendments

E2.1 The objective is clearly understood however the E2.3 listed do not address the issues of the objective. With the number of houses leaking it is foreseeable that water, moisture and dampness will get into houses. Therefore to meet the objective following the event of wetting occurring surely the building must be able to regain compliance. To do this the dampness must be removed in time before B2 and H1 is affected. Therefore E2.1 must relate to B2 remain durable and H1 remain thermally efficient after the wetting takes place.

E2.2 The word “outside” be changed to “any source”. This has the intent of including showers, humidity, pipes and condensation.

Whilst this overlaps E2 it has not been mentioned in this document, why? What is resistance to accumulation? Surely the intent of the code is to have dry buildings, why then talk of accumulation. Surely the code should be addressing a state of health of the building and to do this it must be able to dry and remove accumulated moisture. There are known drying mechanisms some of which are drainage, ventilation (evaporation), permeability and diffusion. Perhaps it is time to introduce these to the industry and lay down the challenge now. Why wait? Just because BRANZ do not accept what is going on is not an engineering or scientific reason not to bring it up.

E2.3.2 “Windows” should be inserted next to roofs and exterior walls, as windows are the greatest source of problems. No cladding manufacturer has influence over windows in walls.

What is meant by “damage to building elements”. Is it intended that the roofs and walls will stop timber rotting. It is foreseeable leaks occur therefore to say this is nonsensical as neither batts nor gib board can handle accumulated moisture. None of these building elements are addressed in this E2/document. Treating the timber allows continuation of B2 durability for timber even if E2.3.2 and E2.3.3 are breached but not the batts and gib. Therefore what will stop them getting damaged?

E2.3.3 The words “in contact with the ground” should change to “in contact with or in close proximity to the ground”. Sometimes water can get in due to capillary or general dampness where there is actually no contact point.

E2.3.5 The words “prevents external moisture” shall be changed to “prevents moisture”. What is external moisture? For example outside water can come from the water supply through the pipes and into walls? Condensation etc is not specifically due to external origin.

E2.3.6 The words “shall be capable of being dissipated”. How? The consultation papers in E2 2.3 states there is no science to dry out a wall so how can the NZBC demand compliance. Surely this would support the Hitex Drying Research – yet Hitex is the only organisation in NZ that has done any research into Drying.

The clause deals with construction moisture. Shouldn't it also be dealing with keeping dry buildings and allowing wet buildings to dry out, not only at construction but also during the life of the building?

E2.3.7 The words “a) The consequence of failure”. We all know the consequence of failure, the building rots. If the intention is to assess liability so the consequence is bought home then it needs to be clearly spelt out. Architects, Designers, Builders, Contractors, TA, Certifier, BRANZ, BIA, NZ Standards, Manufacturer, Owner, Bank, Insurance company – who will have consequence?

See Hitex section 9 Code of Compliance regarding proposals for statutory management of buildings like car warrant of fitness and registration.

16.6 E2 / VM1

1.1.2 (b) Hitex objects to the prescriptive naming of a 20mm cavity especially where it is unproven. Surely it is a functional requirement that suitable engineering of the wall must be undertaken to ensure the

wall design is capable of demonstrating dry walls can be kept dry and wet walls can dry out.

1.1.2 (c) The commentary states “This VM with the appropriate adjustments to testing pressures can be used for proving direct fixed monolithic claddings as alternate solutions”. This is in contrast to 2.3 Verification methods E2/VM1, which states the VM, is only to be used for drained and ventilated cavities. Surely any VM would be suitable for any cladding if it can provide evidence of functionality.

1.1.3 General Comment. The VM describes three classes 1, 2 and 3 for different classifications of building types. Unfortunately at present the main provider of appraisals is only equipped to test class 1 plus a window. This is inadequate considering more leaks come from the items in Class 3. Cladding Services Ltd is working on Class 3 but BRANZ have made it quite clear they will be doing the testing. This leaves cladding manufacturers in no-mans land.

16.7 **E2 2.0 General**

2.2.1.6 Butyl rubber – is 1mm sufficient?

What about plaster flashings, they work okay. Hitex has been using them for 6 years.

What about combination of PVC and plaster.

What about membrane (acrylic) flashings.

2.3 The words “where possible” will allow stucco to continue without proprietary ownership. Is this intended? FC suppliers are trying to angle for the same status. All the suppliers of these products are aiming to dump their products to the building sites and offer no follow-up. Yet EIFS are expected to.

2.4 The word “of 40%” is only important for cold or non -thermal claddings as absorbent heat reflects into the cavity causing condensation. See RB 302 and RB 305.

16.8 **E2 3.0 Weathertightness Risk Factors.**

The words “with claddings that have a limited capacity to dry out any water that gets behind them when a leak occurs” being true needs a solution. Simply installing a cavity does not automatically mean a solution is found. Refer to Canadian research and Hitex Drying Project.

3.1 and 3.2 Hitex offer its Information Bulletin 2003/13 as an option for describing walls

i.e., either naturally aspiring, (no gib) so timber can naturally aspire and dry **OR** cavity to reduce the risk of wall failure when the timber is encapsulated by linings on both sides.

For example what is a 1¹/₂ storey building. What is a 10m high single storey building with a massive gable?

3.3.2 Table 2 Includes fibre cement sheeting as useful directly fixed on low risk buildings. FC is not suitable over any timber frame building as all timber moves. It is therefore only a matter of time before cracks appear and water gets in. What happens to the condensation in these systems.

16.9 **E2 4.0 Roof Wall Junctions**

- 4.1 Why the difference between 75mm and 40mm. Is a product going to be allowed onto the market just because it cannot be turned up? Surely then a different flashing method is required. Before the BIA accepts this they need to visit a site and see that 40mm is not achievable. Tiles are bent with a down turn and an up turn so they flash over and under each other. There is no conceivable way any site tool can bend up 40mm at the ends of the tiles without splitting the bent corners. Are limitations sufficient for products such as these.

16.10 E2 5.0 Parapets and Balconies

- 5.1 Membrane topped cappings work so should be allowed.
- 5.2 Figures 5.4.1 to 5.4.5 with all due respect are the most hideous detail I have ever come across. Hitex will submit one.
- 5.3 Stanchions. People want top fixed rails and they will get them. If functionality descriptions were included then solutions will be found. Hitex will submit one.
- 5.4 Thresholds. When setting distances nominate ‘nominal 100mm’, as timber is actually 90 or 145 etc. 100 will not be possible as no one makes 100 timber e.g. the difference between 190 x 45 and 285 x 45 is not 100mm – but is acceptable as nominal.

16.11 E2 6.0 Decks Attached to Buildings

15% of all leaks came from decks and they only got a ‘one liner’. Surely the BIA is more focused than this.
Hitex has identified approximately 30 essential drawings needed to build decks. Following this consultation paper please get someone to contact us.

And the detail described does not even show separation. That’s bad.

16.12 E2 7.0 Roof Claddings

7.6.3 and 9. These are hidden, concealed and secret gutters. They must be the second product to be banned (after acrylic membranes). Hitex has completed two buildings with secret gutters. One luckily the builder listened and got it ripped out. The other knew better, it’s 2 years old and already leaking. When the process of banning products is known to Hitex please expect the first submissions from us on acrylic membranes and the second on secret gutters like these details. Whenever they block up water simply pours into the roof space and onto the ceiling. Whenever the gutter ages it is too late altogether.

7.7.1 c) Valley gutters should have no changes in direction and remain visually open for inspection.

7.7.6 showing figure 7.7.3 Barrel cappings must be outlawed and banned as they are impossible to flash at a roof abutment to a wall. Shown figure 7.7.9 ban these.

7.8.1 b) delete “(except secret gutters and valley gutters)” and work hard to ban them. It is unbelievable the BIA will allow as an acceptable solution such poorly designed and impossible to rectify products. These products are failing yet they are well into the process of getting acceptable solution status. What is going on here?

7.8.4.7 b) Delete this reference and ban the things.

7.9.1 Why isn’t PVC membranes included. These actually look the best of all. The narrative “membrane roofs and decks shall

have adequate ventilation to prevent the accumulation of moisture under the membrane”. Any idea of how this will be done? If not why suggest it – or is this one of those ‘we are working on them” things.

7.9.2 A) change H3 to H3.2 the new standard.

7.9.3 ‘Seam joints shall be laid so that the joints go in the same directions as the fall of the deck”. This will stop ponding.

7.9.4 B) Membrane up stand needs to be 100mm higher than the floor level.

Not in the commentary but what all the fuss about with decks is where the ranch sliders are. These need flashing correctly. The practise of dumping the ranch slider onto a floor must be changed to having the ranch slider set 20mm (18) down into the flooring so when the membrane is laid there is an up stand water cannot track past to get to the building. Hitex will provide a drawing.

7.9.4.1 Junctions – typical comment. The details drawn are the simple ones. What needs to be done is the complicated ones i.e., where the deck meets the wall, where the ranch slider ends meet the cladding membrane and floor etc.

16.13 E2 8.0 Wall Claddings

8.3 Airseals

Hitex has completed some 3000 houses. If each house has say 15 windows that's 45000 windows. We have only experienced 3 windows with water leakage due to high wind pressure.

Hitex wishes to offer a word of caution. Why spend \$20-\$40 per window on 45000 windows (over \$1 million) when only 3 needed it. Surely then the intent would be ‘Back seal the exposed windows in high wind zone areas”.

The intent is understood but the reality is different. Very few windows of a house are exposed to such wind situations. Many head flashings leaked without wind pressures, so fix them first. The remainder are not broken so why ask for something else. Why seal up the windows even further when what we actually want is some good old fashioned air circulation to dry out walls.

8.4 Bottom of Cladding

Hitex seek as per submissions to Adrian already a table, see section 13 of this document.

8.5 Drained Ventilated Cavities

This whole area needs major rework so the BIA gains a fuller understanding of cavities. Hitex wishes to debate this issue fully and in more detail than section 7 of this document provides. Name the date.

8.6.2 Windows

Hitex sees little value in conform even if it has a BRANZ appraisal. We need to de-engineer the buildings and make wood more breathable. Sticking these types of things on will make wood sweat and unable to dry out. There are other more durable and cost effective ways, e.g. a metal sill tray. See Hitex drawings on sill trays.

8.8.4.4 if the code is saying 300 centres does this mean Harditex can go to 400 centres for battens. How are these to be fixed or will stud spacing be altered.

8.8.4.7 a new section to include architectural attachments is required.

8.11.4.14 a new section addressing how to deal with condensation issues. Metal walls will suffer the same fate as skillions roofs did. Therefore extra thought must go into engineering to prevent condensation getting in.

8.12 disagree with direct fixed FC systems. See Hitex RB 301-307

8.12.1 applicator approved by the supplier of the system". Is the system supplier approved by the FC manufacturer?

8.12.3.2 b) internal corners in table 8 says control joints, is this an intentional deviation as it is different?

8.12.4.4 New section dealing with "Architectural attachments" to be added. "Shall be applied after jointing and sealer coat has been applied". Hitex supplies many mouldings and bands to the FC industry. Many plasterers simply glue them on before they joint or seal the sheets. Therefore once the glue and sealant fails water gets in behind the band and is either absorbed directly into the FC or goes in through the joint, which has not been plastered. It is a cost cutting exercise undertaken by many, as it is a competitive market. No-one understands the problem or can inspect afterwards for compliance.

8.14.1 BCITO Training needs a 3 year monitorium or something. Good for Hitex.

8.14.2 d) Why are head sill and jamb flashings exclusive to U PVC. Hitex has used plaster flashings or "proprietary plaster flashings" for 6 years now. Hitex has used U PVC in the past but discontinued their use as the plaster does not stick and any settling of the building puts pressure downwards on the jamb hence separating and inverting the plastic at the sill causing a hidden leak. Due to these failing Hitex stopped their use in an effort to prevent further remedial costs and litigation.

The BIA should be cautioning before endorsing U PVC. Hitex has also had great performance from metal sills and head flashings, which long-term customers still come and ask for when they build another home. These two should be included as well.

8.14.3.1 Washer diameter should be a range that ensures the EIFS will comply with wind loading tests. Hitex has passed the BRANZ wind load tests using 30mm diameter washers because it has the fibreglass mesh under the washer giving it a far greater resistance factor.

Table 7 needs this as well. Why be specific when a range of products work?

8.14.3.4 The last sentence should be expanded to include function i.e. "control joints shall always be located so that the movement can be accommodated". Hitex has found that control joints actually work best mounted off the support as builders do not provide separately moving supports (like seismic ones). Normally control joints are located over the mid floor and we try and get the mid floor set back 10mm so when it twists it does not bulge the EIFS. Therefore it cannot be mounted onto the timber mid floor, i.e., it is suspended between the top plate and bottom plate of the floor above.

8.14.3.8 Hitex has had better results with sleeves than timber blocks. Blocks tend to twist.

8.14.3.9 Strongly object to window details 8.14.2 to 8.14.4 Debate has been offered to Adrian. If required we will debate the issue again.

8.14.3.10 Wires. This is a good idea but an incorrect observation. Plasticised wire sheathing only becomes brittle if it is installed and embedded along the length of polystyrene. It still does not short out – merely go brittle. There is no evidence that a wire sheathing passing through EIFS will go brittle. See Hitex Information Bulletin 2003/18 for details.

8.14.4.2 Battens. Hitex wish to submit an alternative to battens including its head and window designs. The wording as such is anticipating drainage into the window cavity therefore causing a loading of moisture in the cavity needing a drying mechanism to cope with it. Not good for any system – and again by what mechanism will this expected moisture be able to dry out with.

8.14.4.3 Penetrations are done differently to this on site, as the one shown is not physically possible. See Hitex drawings.

8.14.4.6 Parapets. What is the shape going to be 5° or 8.14.12 saying 10° minimum. Roofs have penetrations so why can't parapets. Does not make sense. Surely solutions will be found.

16.14 E2 10.0 Construction Moisture

10.2 a (1) This allowance of 20% for insulated buildings assumes that at least a 2% reduction will occur. What is the process for this to happen? Will it happen with battened cavity systems known to contribute to moisture up take? At present the mc is taken 600mm up the wall. Hitex research suggests it is the bottom plate that requires reading, as a considerable gradient of the mc exists between the bottom plate and 600mm up the wall. RB310

The Hitex research suggests that if a building was lined at least in winter the bottom plate is wetter than 600mm up. At moisture contents around 20% condensation is likely to occur at around 10°C temperature differentials between the outside walls and inside walls.

Is the code condoning this as it is expecting it to be a short-term thing? If so then again what are the drying mechanisms and do they work throughout New Zealand throughout the varying seasons and with varying claddings.

10.4 New Section There needs to be a section here that outlines what will happen during the life of the building. This section only deals with moisture at construction. This is very important and must not be left out.

16.15 E2 Table 7 (Page 76 EIFS section) Fixing Selection for Wall Claddings.

- Washer diameter should be a range depending on testing 20-40mm
- Washer location should be set out in accordance with testing results.

17. Appendix's

Hitex Research Bulletins

301	Drying Out of Wet Timber Building Walls
302	Insulation and Temperatures within Building Walls
303	Drying Wet Sole Plate in Building Walls
304	Drying of Wet Timber Wall Section
305	Microclimate within Wet Timber Walls
306	Interstitial Condensation in Wet Building Walls
307	Microbiological Examination
308	Wood EMC Predictions
310	Diffusion Chamber Research
311	Mews Task 6, 7 & 8 Research in Canada

Hitex Information Bulletin

2003/1	Shrinkage Cracking & Surface Defects in Exterior Plaster
1998/2	Painting Plaster
2000/3	Extra Depth Reveals
1998/4	Cleaning Materials and Methods
2003/5	Stop Ends for Apron Flashings
2003/6	Parapets / Penetrations
2003/8	10 Simple Checks for Hitex Plaster Claddings
2003/10	Horizontal Fixing for Hitex EIFS Wall Claddings
1998/11	Scaffolding Erection Requirements for Plaster Buildings
2000/12	EIFS to Brick Junction
2003/13	Naturally Aspiring and Diamond Cavity Systems
2003/14	E2 Solutions for Barrier Wall Cladding
2001/15	Heavy Lifting
2001/16	Non-notifiable Scaffold
2001/17	Building Source of Leaks and Dampness Penetration
2002/18	Electrical Cables in Contact with EPS
2003/19	R-Values
2003/20	Cavity Construction
2003/21	What's Treatment got to do with it?
2003/22	Undersill Trays for Windows
2003/23	Head Flashings
2003/24	Fastenings for Exterior Cladding
2003/25	Plumbing Pipes Penetrating Walls
2003/26	Fire Danger and Polystyrene
2003/27	Electrical Meter Boxes
2003/28	Garage Door Entry Levels

Hitex Drawings

Photocopy of hand written notations to Volume 2 drawings.

Hitex Works Compliance Certificate.

Pesticide Trust Table of Toxicity.

Hitex Experiences.