

# Criteria 2

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## Criteria 2:

### Site visit:

Initialisation method: The cupboard will be installed into the passenger's side of the vehicle it will be secured the floor and the wall. Using two points of contact will ensure that it does not rattle or become a projectile.

Use method: The cupboard will be easily accessed by the user with all of the draws opening straight out, these will be secured using some style of latch so they don't open whilst driving and have a secure feel when they close. The water tank will be located on a tilting tray to ensure that the user can easily use it even when there is not much water in it.

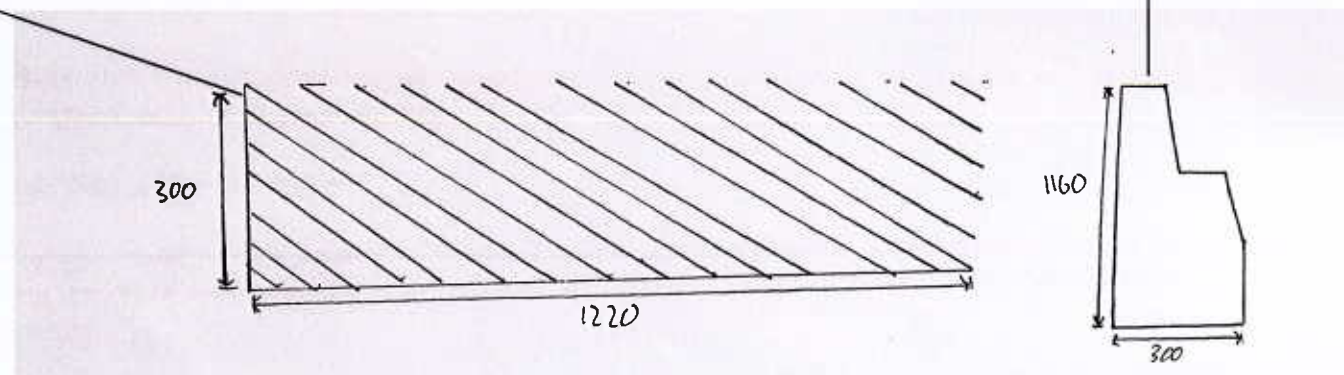
The cupboard must have secure mounting points that minimise rattles and vibrations and so that it will stay secure in the event of heavy braking or a crash.

End users van: My users van is a 2004 Mazda E1800 SWB it's in the light commercial class vehicle. During the production of the product, weight and how compact the cupboard is will be a priority, as this van is considered a micro van and there is not much room inside. The weight of the cupboard is important because my users van only has a 1.8L motor which puts out less than 100HP, so the lighter the product is the better. The aim is to minimise the performance loss from the added weight. Another factor to be considered is the weight distribution and how it can affect handling and ride if it is too uneven. If too much weight is on one side the car may drive different and pull to the side the weight is on, as well as making it unsafe around corners.

Inside van dimensions:



Figure 4 Inside of users van



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Dimensions of required contents:

Water container:



Dimensions of water tank:  
L=460mm  
W=170mm  
H=360mm



Tool box:  
L= 460mm,  
W=160mm,  
H= 165mm



Wash bucket:  
L=370mm,  
H=130mm,  
W=300mm

Cups:X2  
Diameter=  
90mm,  
height= 80mm



Plates:X2  
Diameter=  
260mm,  
height=  
30mm



Contents measurements are a very important part of my research as it allows me to figure out the design and how big the draws/slots will have to be to fit the required contents.

User comment: "the 4 box idea does not offer much, I don't like how simple it is and can see it holding items securely whilst driving as it has an open front"



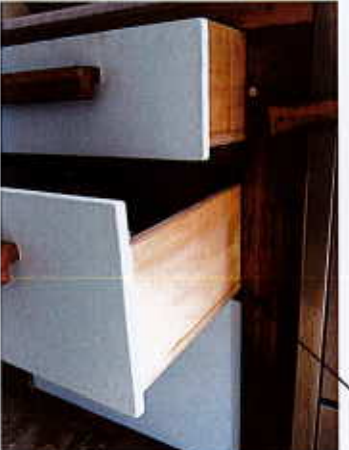
Visual, tactile and aesthetic: This design has clean symmetrical lines and contrast the colour of the natural wood handle with the white draw face. This appearance is something my end user has requested.



Innovation and creativity: This design is very simple and does not show any aspects of innovation and creativity. It does not push the boundaries of current products. This is an example of something that I will try and avoid in my design. As my end user would like the product to have aspects of innovation and creativity.

Materials, properties and characteristics: The inner draw portion of this design is made out of 6mm plywood sheets while the handle is made out of hardwood. While the plywood is light and durable the hardwood handles are a more visually appealing material whilst being very strong and durable. These characteristics are requested by the end user so that the product can perform to its maximum.

User centred design: This design considers the safety of the user as all the edges of the handle are rounded which ensures that no cloths get caught on it as you walk past. This is in line with my end users constraints.



Purpose, function and context: The primary function of this design is to store kitchen utensils. It is a very simple pull out draw design that does not use any rollers. This does make its operation slightly harder than if it had rollers but makes it reliable as there are less components to break. This is in line with my end users' needs as the product must be reliable.

Innovation and creativity: This design's solution to weight management is that it uses cardboard boxes to separate storage. Having open faces and items split up into grouped boxes means that it is very easy to just take out the items you want. This is relevant as my user wants my product to have separate sections of storage as well as keeping the weight low.

Primary research:

User comment: "Metal draws strong, might be a little heavy and overkill but really good for a tool draw. I like how it uses metal rollers for smooth operation. Maybe a space can be made for a tool case?"

Purpose, function and context: The operation of this product is very smooth as the draw is on rollers. This makes the product feel of better quality as the user does not have to put in much force to open the draw. This ease of operation is requested by my end user.



User-centred design: This design considers the users safety as the rollers it slides out on have a stop which means the draw cannot fall out. This is in line with my end users requirements as my product will be used in a car and whilst driving the draws cannot fall out.

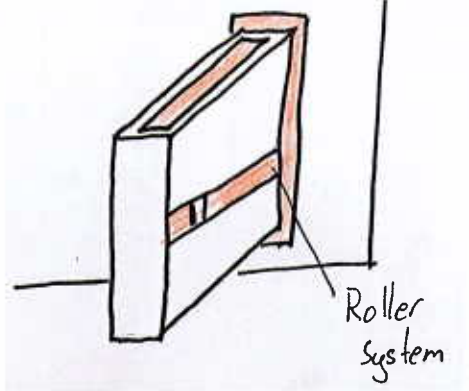
Material, characteristics and properties: This design is made out of mild steel sheet metal. This material is very strong, ductile and malleable making it easy to conform to shapes. These properties include ones requested by my end user.



Visual, tactile and aesthetic: This design has embraced the natural colour of the material and is an example of symmetrical design as it has a lot of straight edges. This is in line with what my end user has stated that they would like.

Purpose, function and context: The primary function of this design is to store food and a stove/ gas bottle. This design uses a magnetic strip to hold a knife, this is a secure storage method and it keeps it out of the way. This is relevant as my user wants the product to securely store the required items.

Materials, characteristics and properties: This design is made out of structural plywood wood. This material's properties include being strong, dense and very durable. These characteristics are in line with my end users requirements therefore structural plywood is a material that could be used in my product.

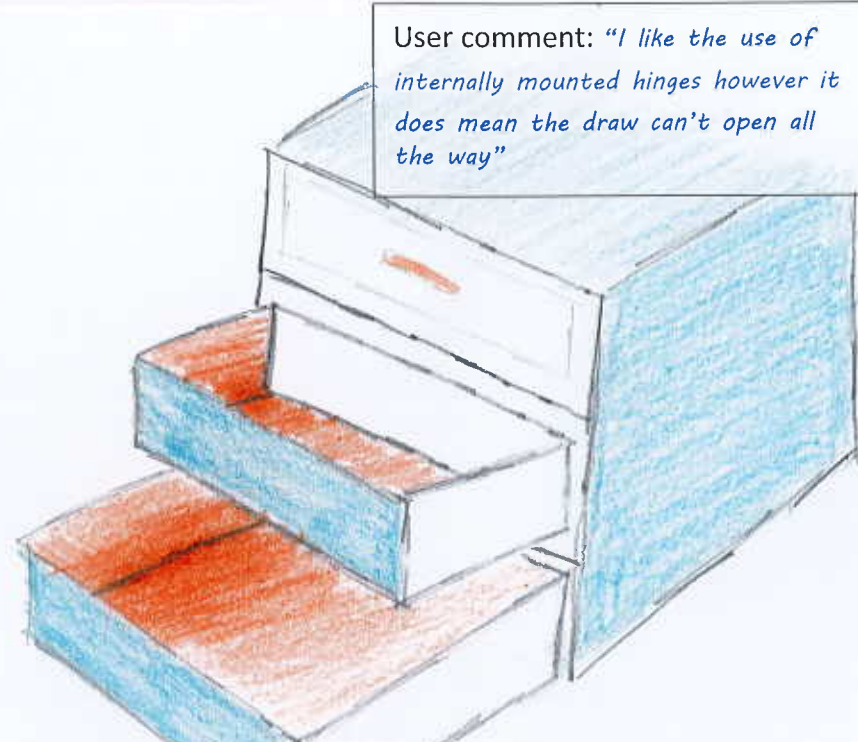


User comment: "it has a compact look and fit although cupboard can do with a mesh cover for sun protection"

### Primary research:



**Purpose function and context:**  
This design's primary function is to be a storage draw. It is operated by pulling the handle out. This draw is on rollers so its action would be very smooth. This design uses different compartments to hold items securely. This is relevant as my end user has requested that the product has multiple areas to store items which will help with organisation.



User comment: "I like the use of internally mounted hinges however it does mean the draw can't open all the way"

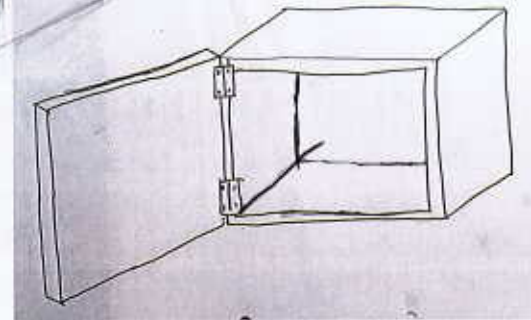
**Visual, tactile and aesthetics:**  
When this product is closed it has smooth lines and has a symmetrical design. This is achieved as it uses hinges that are invisible from the outside. This is relevant as my end user has stated that they would like the cupboard to have smooth lines.



**User centred design:**  
This design considers the users safety as the roller mechanism has a stop so the draw can't fall off its rails. It also uses anthropometric data to determine how far out the handle is and its width. My end user requires a draw that does not fall out whilst driving. Image was taken at Bunnings.

**Visual, tactile and aesthetics:**  
This design has a sleek look when closed with a smooth texture whilst remaining functional. The colour of this design reflects light and has a negative space as it blends into the surrounding because of its natural colour. As my end user appreciates smooth lines this product is ideal.

User comment: "I like how simple this draw is and therefore how reliable it will be however I am concerned that its action won't be as smooth as designs using rollers as this draw just runs on wooden supports"



**User centred design:**  
This product has height adjustment in the central divider which means it is more accessibility to accommodate larger items. This is an example of universal design as it can store multiple items that are different sizes. This is relevant as my end user will be using the cupboard to store things that are a range of sizes.

**Materials, properties and characteristics:**  
This product is made out of a medium density board (MDF). MDF board is very durable and very stiff which makes it ideal to use in the production of commercial cupboards. These characteristics are requested by my end user which makes MDF a possible material choice.

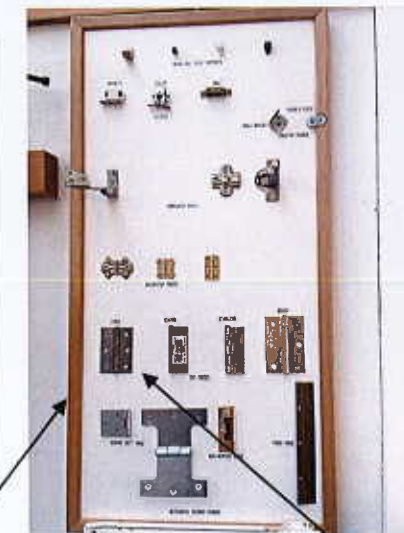
**Function:**  
This design's primary function is to act as storage, it has limited capacity as the front face is not as tall as the sides. The quality of this product is high as it uses a finger joint to connect the side and front piece. This is relevant as my end user requires the cupboard to act as storage.

**Purpose, function and context:**  
This design is very simple as it does not use any hinge or roller it just slides on a piece of wood. This means it is very reliable which is a request by the end user as it will be used a lot.



**Visual, tactile and aesthetic:**  
This design uses a range of materials which give it a contrast in colour which creates an aesthetic appeal to the product. This is relevant as my user has requested the use of different materials therefore different colours and tones.

**Materials, properties and characteristics:**  
This product is made out of steel which is very strong, durable and rigid. This is important as this hinge may be supporting the water tank which weighs over 20kg which requires the hinge to be strong.



**Purpose, function and context:**  
This product is a simple steel hinge and allows a cupboard face to swing open and close. As this design is so simple it can be assumed to be reliable and perform its job well. This is relevant as my end user needs the product to be reliable as it will see a lot of use.

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User comment: "both of these locks are great and depending on where it would be used will do the job, easy to use."

Cupboard fasteners:

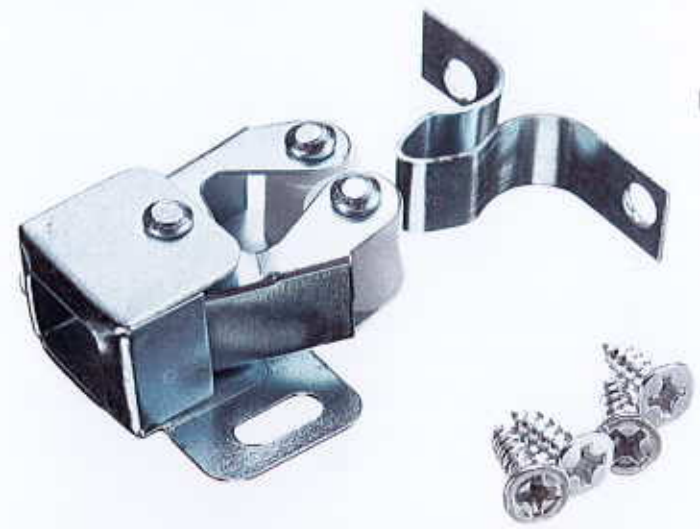


Figure 6 Sliver roller catch cabinet latch

Visual tactile and aesthetics: This fastener will be hidden as it sits behind the sliding draw this leaves a clean and sleek appearance to the front and reduces protrusions that the user could catch items of clothing on. This is relevant as my end user would like the product to have smooth lines and remain

Material: This fastener is made out of metal which means that it will be durable and strong which is a positive as one of my end user's requirements is that it is durable as it will be seeing a lot of use.

Purpose function and context: This fasteners is located behind the draw with one part fixed to the frame and the other on the sliding draw. It holds it in place with pressure which makes it very simple and reduces the number of parts that could fail. Its operation is very simple and thus reliable. It will give the user a positive feeling when it is locked and will require force to pull it open which will mean that it won't open during driving around corners which is a requested by the end user.

Secondary research:

Material: This cupboard fastener is made out of plastic with push in magnets and a metal plate that the magnets attract too. Compared with figure 6 it might not be as durable and could possibly crack which would lead to failure of the product. From this photo it is hard to tell how strong the magnets are but if they are weak it will affect how securely it holds the draw in place. As durability and strength are constraints for the end user the material used might not be suitable.

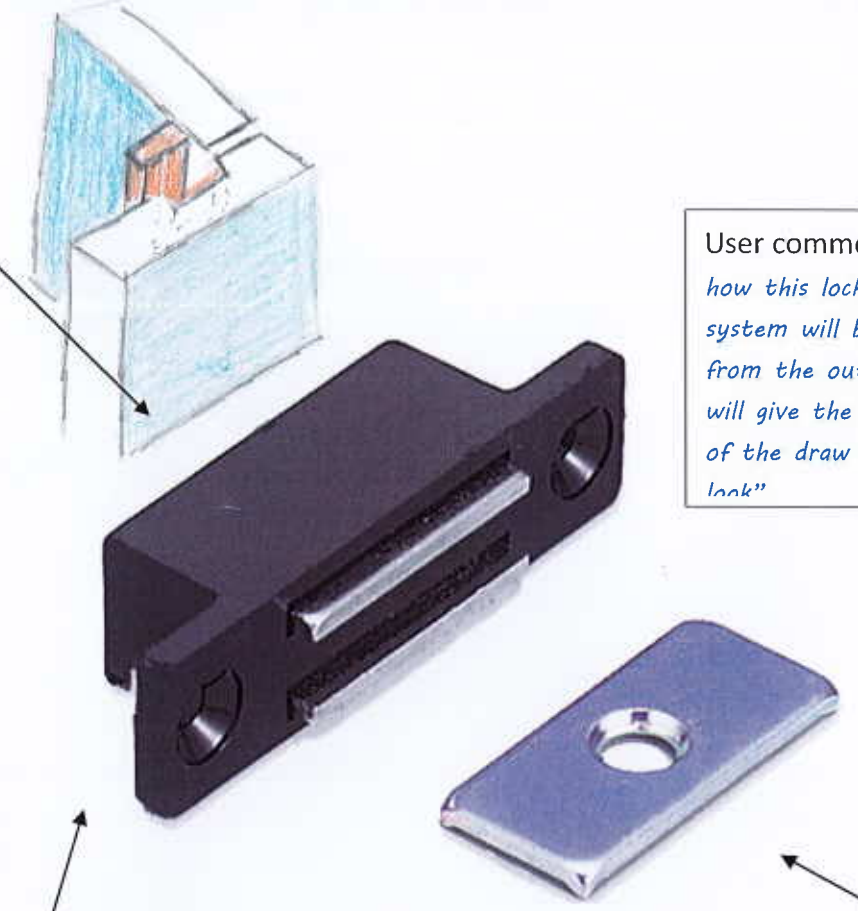
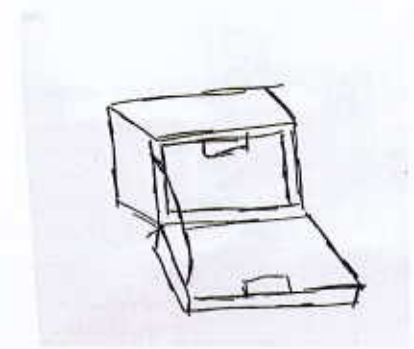


Figure 5 Magnetic latch

User comment: "I like how this locking system will be invisible from the outside which will give the front face of the draw a clean look"

User-centred design: As stated on the products spec sheet this magnet latch requires 5.5kg of force to separate the strike plate from the main unit. This force could be too much depending on the type and ergonomics of the draw handle. Since it is going to be located in a tight area it might not be ideal.

Purpose function and context: Depending on how strong the magnets are it might not be as secure as figure 6 which could cause the draw to open whilst driving which is not ideal. Between figure 6 and 5 I preferer 6 as I believe it will hold it more securely because of the pressure being applied to the metal clip. As stated by the manufacture this magnet requires 5.5kg of force to separate which is pretty even with the roller catch latch. Its primary function is to hold the draw securely. Spec sheet. (Concept Latch Lock and Hinge, 2019) As this product will be installed into a van the strength of the latch is important.



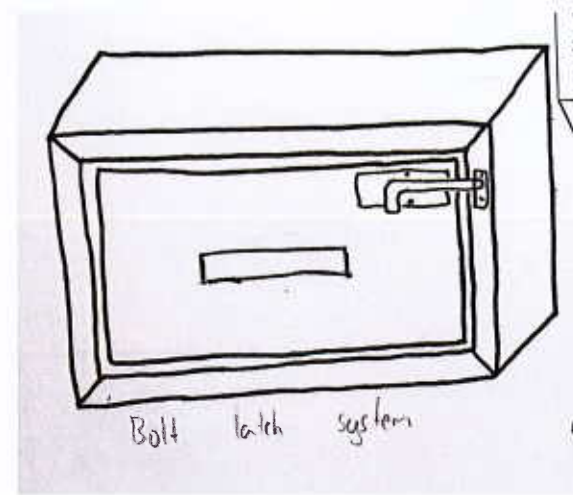
Visual tactile and aesthetic: This latch would be located on the outside of the draw meaning it will be visible and won't be as sleek and clean appearance as figure 5 and 6. It is also larger than both figure 5 and 6. As my end user would prefer the product to have smooth lines it is not ideal.

Purpose function and context: This is the simplest design and also the most secure closely followed by figure 8 which makes it very reliable. This is good as the draw cannot open whilst driving. Its primary function is to securely fasten the draw.



Figure 7 Bolt latch

User comment: "I like the security and simplicity it offers but it might be a bit bulky and could get in the way"



Materials: This fastener is made out of thick steel therefore is very durable and long lasting. It uses a very simple spring loaded system which is likely to be more robust than figure 5.

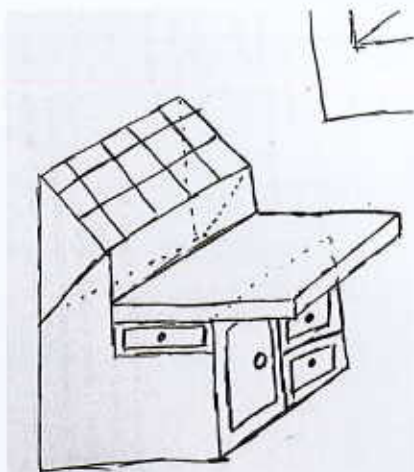


Figure 8 Spring bolt latch

Design inspiration:



Visual, tactile and aesthetic: This design has a very clean and spacious appearance, this is achieved by the use of white as a base colour which means the light reflects of the inside of the van and gives the perception that the space is bigger than it is. A negative to using white is that it gets dirty very easily and in a camper van this is not ideal. As vans can become dark and are generally quite small this is a good solution.



Innovation and creativity: This design feature pull out draws which doubles as a seat this is a good example of a dual purpose item which is an essential characteristic in a van. This is the modification of an existing product to produce an improved solution. It also gives the user a table when stopped to prepare food or just as a storage area. This is an example of an improved solution.

User comment: "This fit out has a very natural look and I like to dual purpose seat something that I would like to see in the product"



Innovation and creativity: This design has solved the limited storage issue in a van by putting a large amount of the storage on the roof to declutter the floor. This means it is easily accessible and gets it out of the way especially in larger vans. The end user requires a large area for storage as they are planning to be on the road for lengthy periods of time.

Materials- characteristics and properties: The bench tops in this design are made out of thick sheets of wood which highlights the bold edge and also increases durability and strength which are some of the requirements of the end user.

Purpose, function and context: This design has enabled both the seat and the pull out draw to be used at the same time, which means both primary and secondary functions can be used at the same time. This is ideal if there are more than one people traveling because one can sit down whilst the other prepares dinner.

Visual, tactile and aesthetics: This design when not has a clean and sleek appearance but when the draw is extended in reveals a very functional and practical product. This is what I am going to try and to do with the front faces of my design.

User comment: "both of the vans are really tidy well thought fit outs, I think out of budget but the natural bench top is a nice touch"

User centred design: This design feature's book storage as part of the structure of the chair this means the user does not have to get up to put a book away and to pick up a new one. Also the ergonomics of the seat angle you back into the seat which means the user won't slouch as much. I like how the product designed to read books has include book storage which overall make it easier for the end user. This is something I would like to try and use in my design.



Purpose, function and context: This designs primary function is to neatly organise the plates and mug so will in transit everything stays secure as well as air drying the items with its open faces. However the plates don't have divides and unless they are tightly packed they will rattle whilst driving.

Innovation and creativity: This design incorporates storage into the frame of the chair, using the structure of the chair and building shelving into it. This an example of pushing the boundaries of conventional seating. This is something I might what to do in my design as it has multiple function and needs to be compact so the more aspects that serve two or more functions the better, this is an example of a new idea to solve a problem.



Material: This product is made out of plywood which is light and durable and will not damage the plates and mugs that it contains. Rubber strips could be used on contact points to further quite some rattles. The end user will require the product to be made out of durable materials to withstand the regular use and abuse.

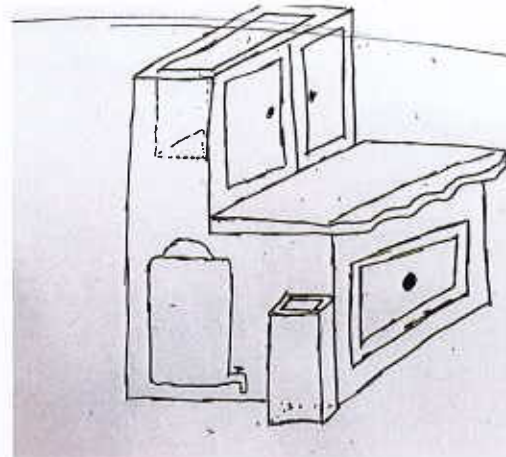


User comment: "the idea of keeping items close to the space that they will be used in is really good as it makes it easy to access them and not have to move around too much"



Purpose, function and context:  
This products primary function is that it neatly holds plates and bowls apart from each other which means they won't rattle or chip and will also allow air flow which will help dry them out after washing. This will be useful in my design as this is a requirement that my user has stated and will work well in my users van.

User centred design:  
In this design all of the plates and bowls are facing up making it easy for the user to pick them up. This is done by using anthropometric data of a human hand. This is useful in my design as the plate storage will be in a small area and the easier they are to remove and put back the better as stated by my end user.



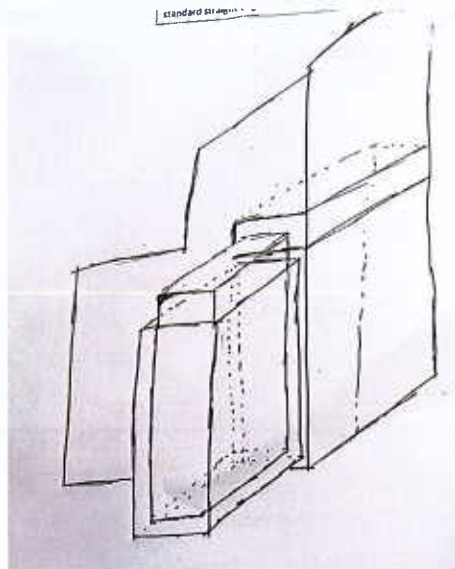
User comment: "clean tidy method of storing and organising bowl storage. This design will ensure that there are no rattles or chips that happen whilst driving."

Visual, tactile and aesthetic:  
This design is very appealing and practical. It contrasts the natural colour of the wood and adds a different texture. This is useful as my end user has implied that he wants different material to be used in the construction of the product to mix it up.



Purpose function context:  
This design is attached onto the back of a cupboard door and sits pretty flush with it meaning that it does not take up much room. Its primary function is to hold cutlery in the environment of use. This relates to my design because I do not have a big area to work with and any compact storage solution is useful.

Material:  
This design uses denim which is the cutlery is put in slightly wet will dry and will stop and rattles between them. It is an example of a durable material which is request by my end user.



User comment: "water storage is perfect easy to refill, tidy and well secured. I like how it can be removed easily in case you want to take it out of the van to clean it or use it somewhere else"

Purpose, function and context:  
This design is similar to what I am planning to do as its primary function is to hold a water tank which is easily accessed. This is important as it is a required item that my cupboard holds.

User-centred design:  
This design positions the water tank on two hooks which makes it easy to remove and use. It is also located on a sliding draw which keeps it out of the way when not in use, this frees up space and removes clutter. My end user will need to easily access this water tank and being able to get it out of the way will be helpful in such a small space.



Innovation and creativity:  
This designs table top is life edge design. This follows the raw edge of the tree it was milled from and leaves a raw natural feeling. This is a modification from the standard straight edge milled table.

User comment:  
"I like how this design uses the natural shape of the tree to form the edge of the table, however not sure how durable this would be the bark might fall of overtime"

Visual, tactile and aesthetic:  
This design give the edge of the table a rough natural texture and means every piece of wood has a different pattern and structure which give the product an individual feel. From looking at my user's jewellery he embraces this nature unique design style in his



Material:  
This design uses a large cut of pine with the natural trees edge still intact. This will ensure a durable and strong tabletop. Which is requested by my end user.

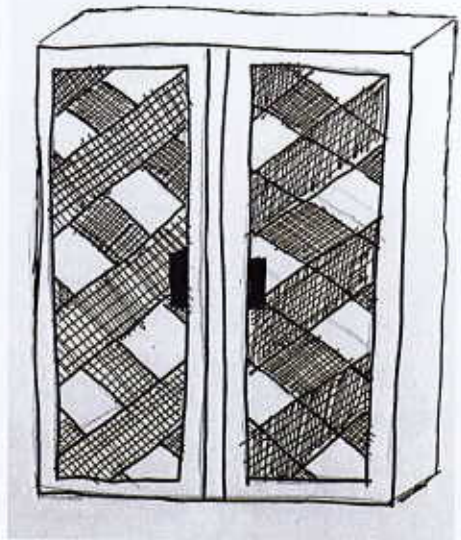


## Secondary research

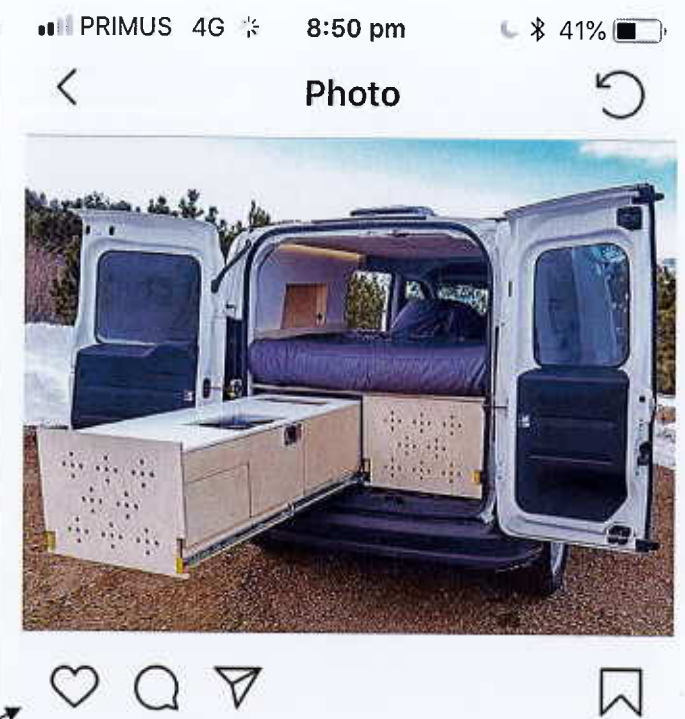


**Innovation and creativity:**  
This design uses the inside walls of the van as a storage place. This makes the floor space free and keeps everything at a comfortable height to access. This is a new idea which is an improved solution as most vans store these items in draws. Removing the draws also saves weight and material. My user has communicated with me that he wants the product to use new ideas and technologies that improve the function of the product.  
Source:  
Instagram(vanlifediaries)

**User comment:**  
*"There is a lot in this photo, and looks great parked up with all the stuff around, might be a little noisy on the road. The plate rack is great and I really like the feel of this set up, loads of space and tidy if there are draws for all the stuff"*



**Innovation and creativity:**  
This design has cut outs in the ends of the pull out draws. One this saves weight and also allows air flow to keep contents fresh. This is an example of an experimentation and the modification of an existing design. This is relevant as my user as requested that the product must be light weight. Source:  
Instagram(vanlifediaries)



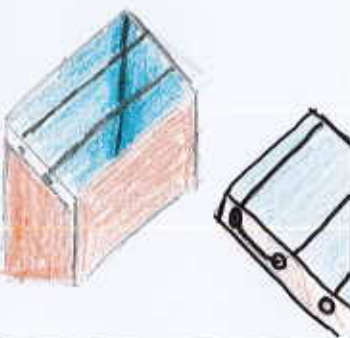
**Purpose function and context:**  
This design's primary function is storage. It is a pull out draw which when not in use acts as the bed's support. This design has both a primary and secondary function which is requested by the end user.

**User-centred design:**  
This design places all of the items on the wall which makes them very accessible to the user. This is inline with my end users constraints as the product needs to be very functional and easily accessible.

**User comment:**  
*"Pull out draws good use of space under the bed the only negative is it does not easily allow access to the draws from inside the van which means it might not be the best when it is raining and you have to get something out of one of the draws"*

**Visual, tactile and aesthetics:**  
This design has a homely feel as items that symbolize home are strung along the walls. These items contrast the very natural looking wood and introduce colour into the conversion. My user would like the product to have smooth lines and remain functional which this design has.

**Visual tactile and aesthetic:**  
This design has a mixture of white painted wood and natural wood this highlights some aspects of the interior design. The use of this contrast gives the inside a homely, rustic feel with the raw wood with a twist of modern contemporary style with the white highlights which also help to bounce light around the inside of the van. Source:  
Instagram(vanlifediaries)



**Purpose, function and context:**  
The primary function of this design is to securely hold shoes to the side of the cupboard. This is done by using elastic cord, as this design is very simple it is most likely reliable which is a requirement of my end user.



**Materials, characteristic and properties:**  
The material used in this design is elastic cord. Some of the characteristics of this material are that it is light weight, strong and has excellent recovery which means it will continue to hold the shoes firmly over time. As these characteristics are requested by my user this is a good material to use.

**User comment:**  
*"I like the use of the elastic as a shoe holder it keeps the floor space clutter free and holds them securely whilst driving"*

**User centred design:**  
This design has located the storage cupboard across from the main seating area. This makes this cupboard very accessible to the user. The distance between the bed and the cupboard ensures the comfort of the user. This is relevant as my end user has stated they would like easy access to the cupboard and water tank.

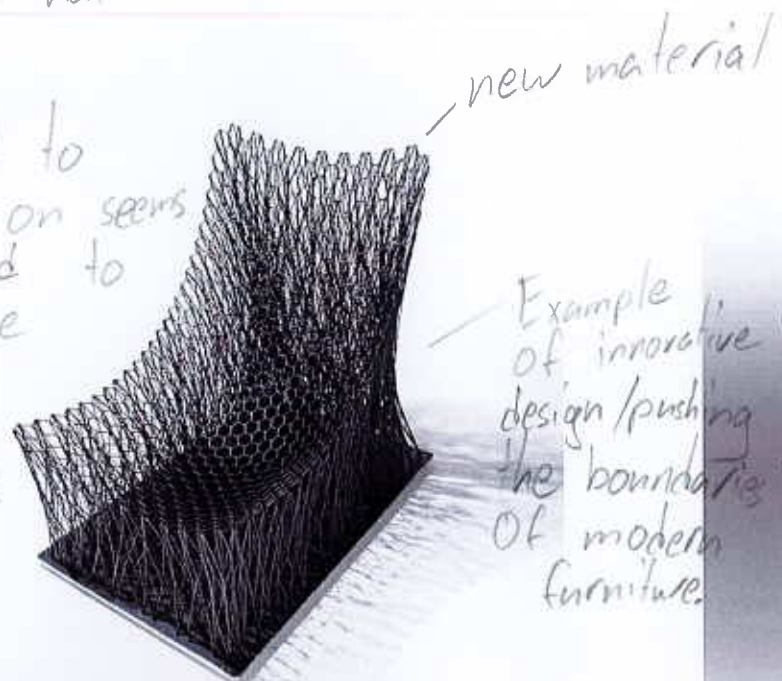
**Mood board:**

Forms a natural Path

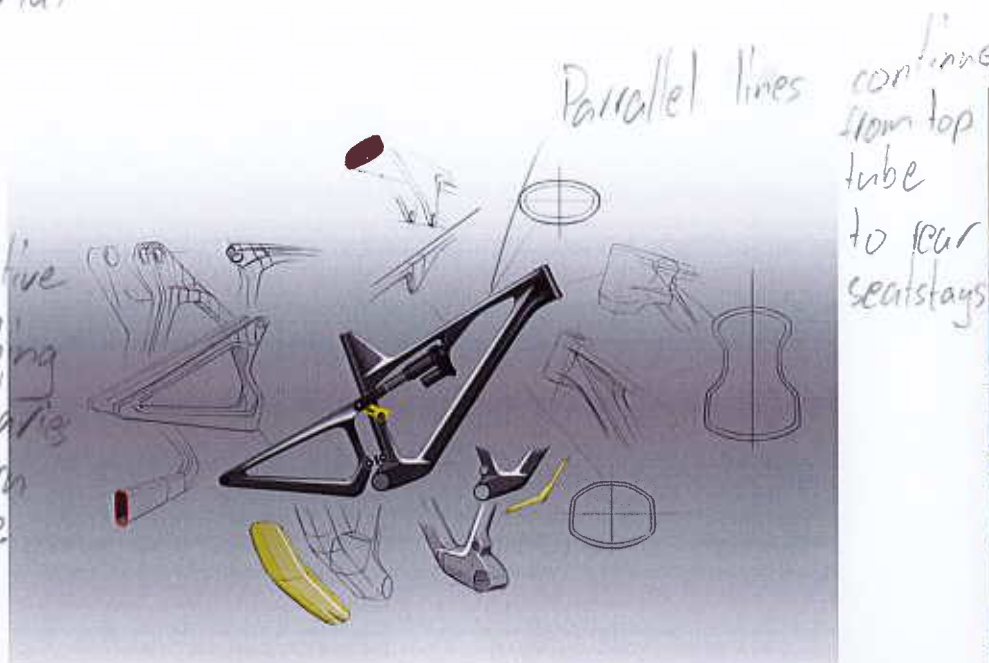


Good to use on seams of wood to break the uniform straight lines.

Uses black highlights to compliment the natural colour tone change in the wood



Example of innovative design / pushing the boundaries of modern furniture.



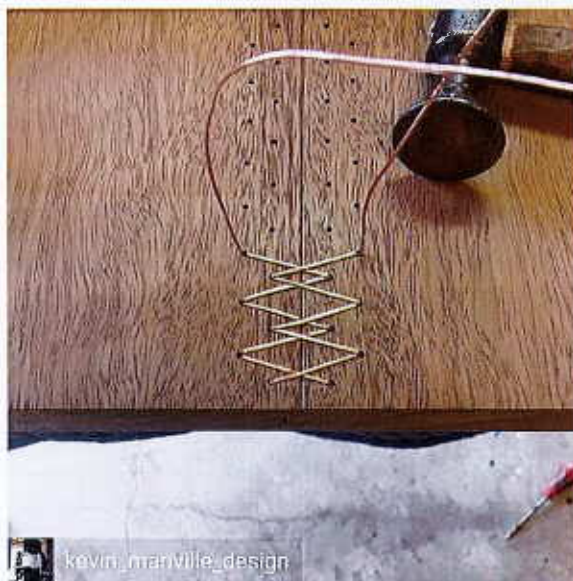
Natural form / smooth similar to leaves / petals



Contrasts natural colour with harsh dark colour



Industrial / tactical



Textile inspiration



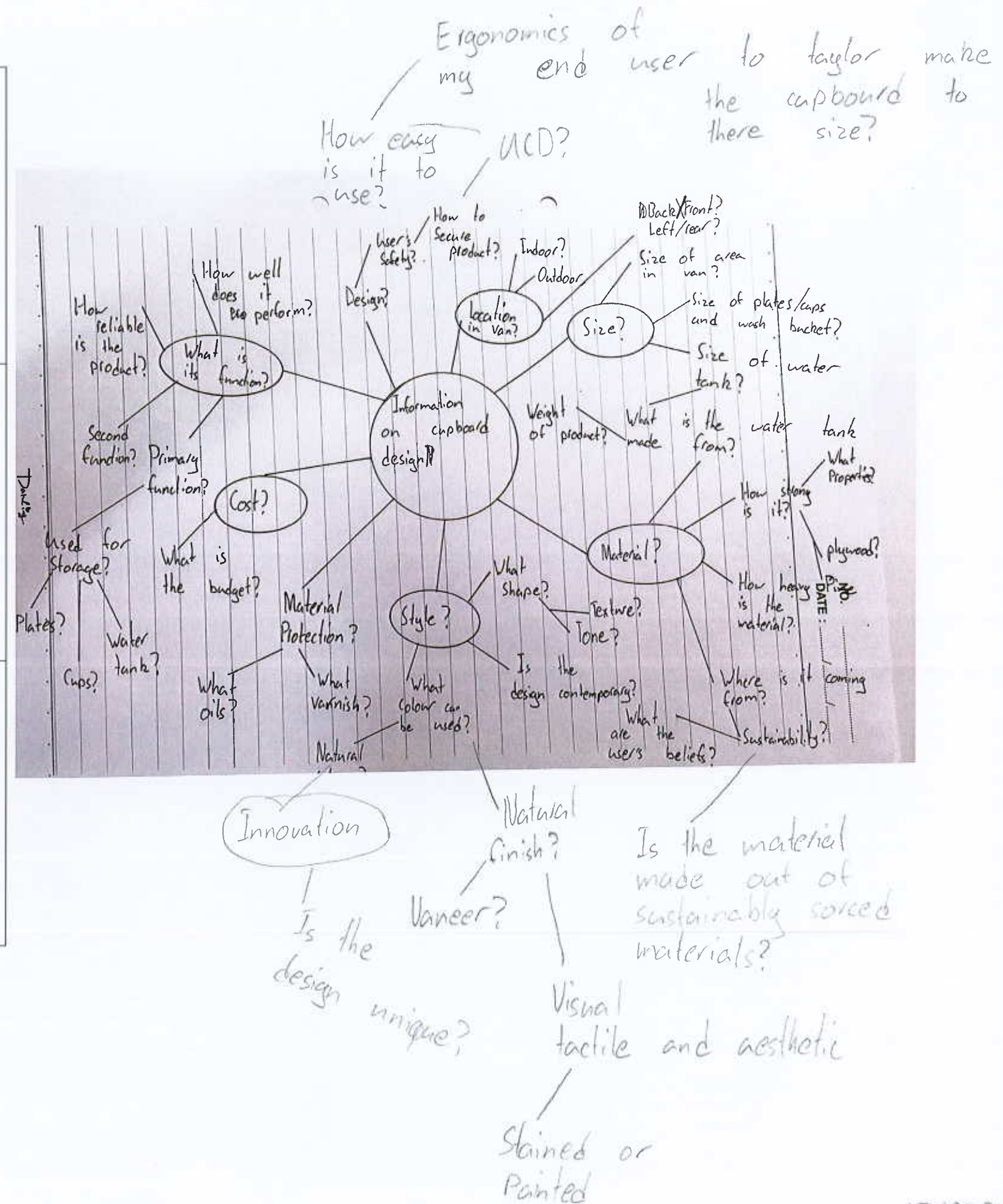
Using a very uniform item (Bolt) and joining them together to create an undulating product



Raw texture makes it look rustic. This gives it a rough appearance.

**Lotus diagram:**

<p><b>Colour</b></p> <p>The colour of this product must remain natural to the material used.</p>	<p><b>Safety</b></p> <p>This product must be secured to the sides of the van in multiple places. This is to ensure that under normal driving conditions of in a crash the cupboard does not become a projectile leading to the safety of the user being compromised:</p>	<p><b>Quality</b></p> <p>The product quality must be to a very high standard and has to be very durable to last the regular use that my user has communicated with me it will see.</p>
<p><b>Cost</b></p> <p>The cost limitation for this product is \$250. This will be achieved by minimising the amount of material waste therefore saving money.</p>	<p><b>Principles of design: Cupboard</b></p>	<p><b>Visual appearance</b></p> <p>The product must be an interesting and appealing design that must have smooth lines whilst remaining functional.</p>
<p><b>Finish</b></p> <p>The finish of the product will need to be very durable and resistant to water so that it will withstand to use that this product will see.</p>	<p><b>Material</b></p> <p>The product must be made out a durable light material either plywood or MDF. Both these material are strong and have a high density.</p>	<p><b>Measurements ergonomics/size</b></p> <p>The product must be able to fit within the rear door of the van and the left hand side sliding door. It must leave an area which can be used as a walkway between the product and the other side of the van.</p>



**Bibliography:**

<https://www.pinterest.com.au/>

<https://www.conceptlatch.com.au/product-category/latches/bolt-latch/>

<https://www.conceptlatch.com.au/product-category/latches/magnetic-latches/>

<https://www.conceptlatch.com.au/product-category/latches/spring-bolt-latch/>

<https://www.pinterest.com.au/pin/478859372853938654/>

<https://www.pinterest.com.au/pin/729372102130945709/>

<https://www.pinterest.com.au/pin/607915649680239102/>

**Bunnings(photos taken by myself)**

**GGs tech rooms**

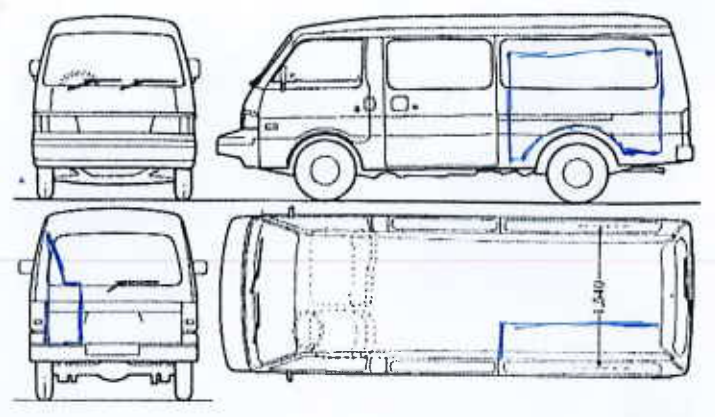
<https://www.unno.com/burn/>

<https://www.pinterest.com.au/pin/325596248060401102/>

<https://www.pinterest.com.au/pin/525373112779809192/>

<https://www.conceptlatch.com.au/product-category/latches/catch-latch/>

Valentino



Space in van that the product will live

Abstract shapes geometrical

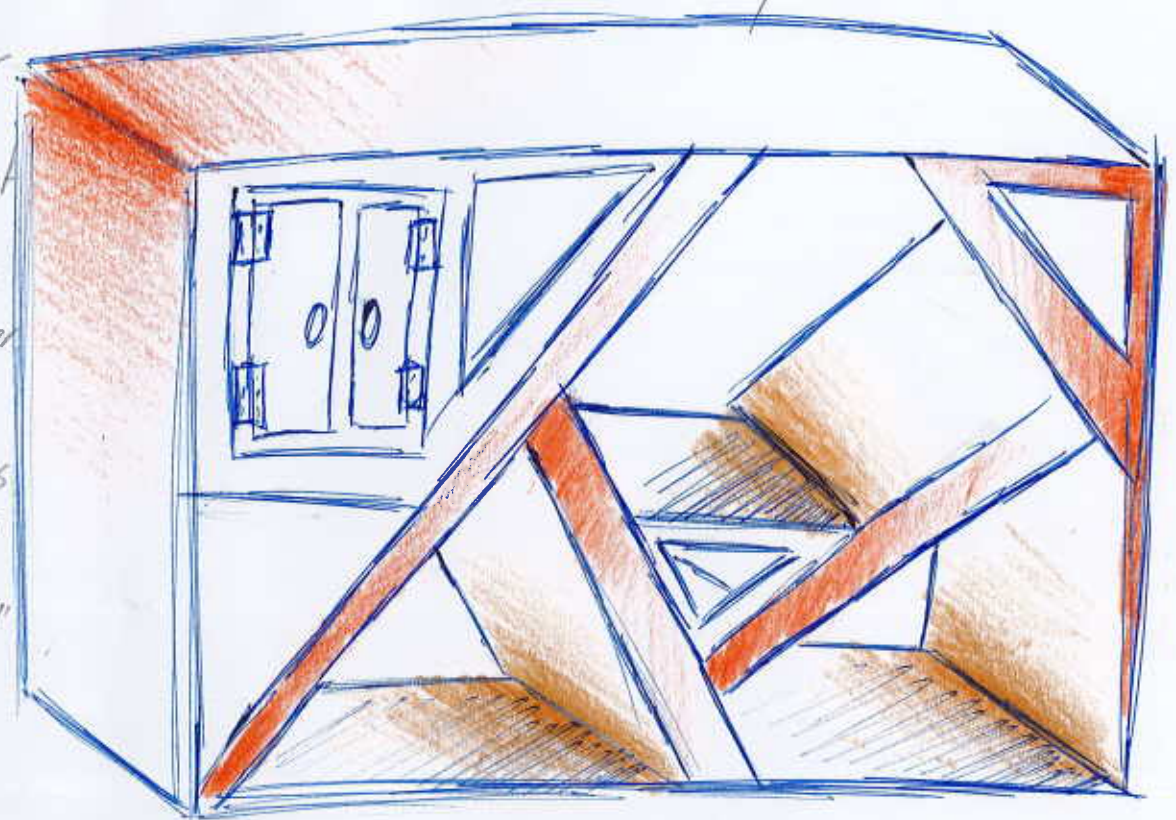
Material: Mild steel (strong, durable)

Simple, minimalistic

14  
Integrated storage without a door

User feedback

"I like the abstract look and the use of triangles as a theme, however this design has open shelves which do not hold items very securely when in motion this could cause issues"



Clean, smooth appearance from the outside



Inspiration

Nothing to catch clothing on smooth outside

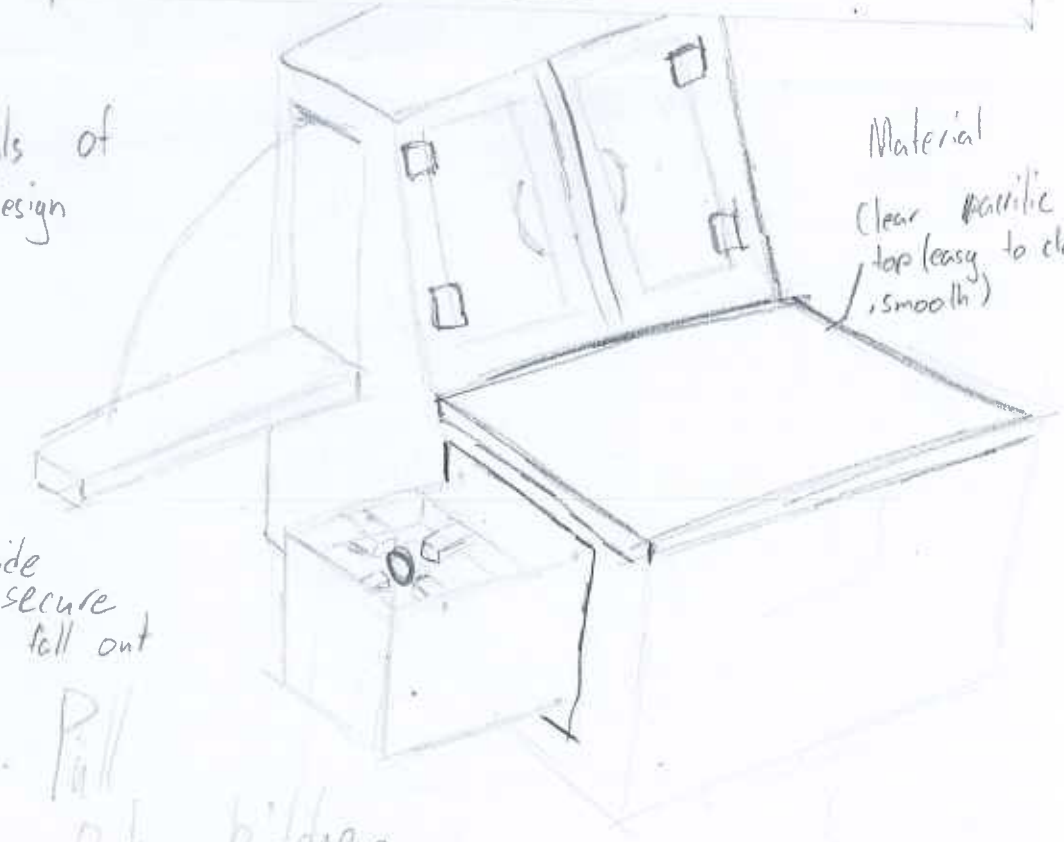
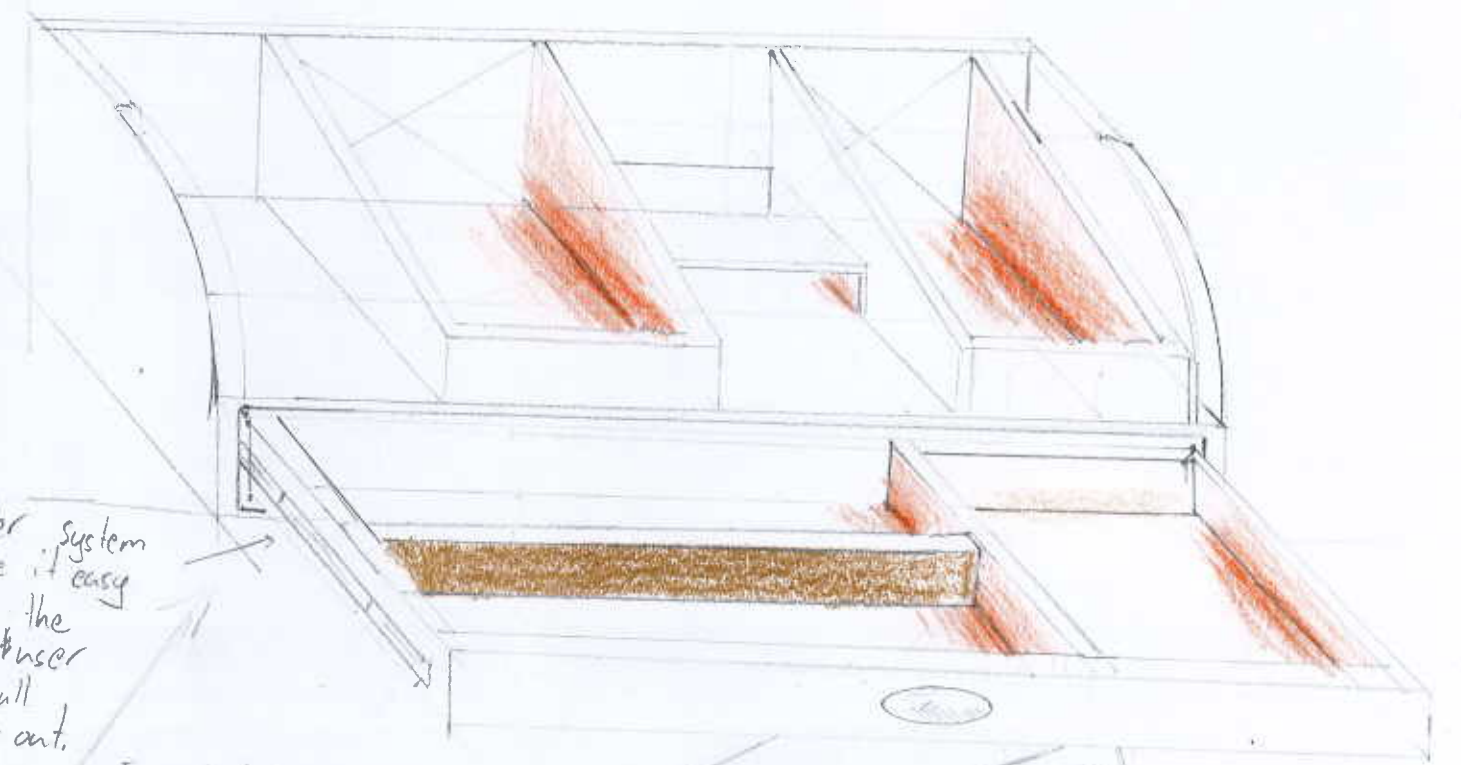
Roller system make it easy for the end user to pull draw out

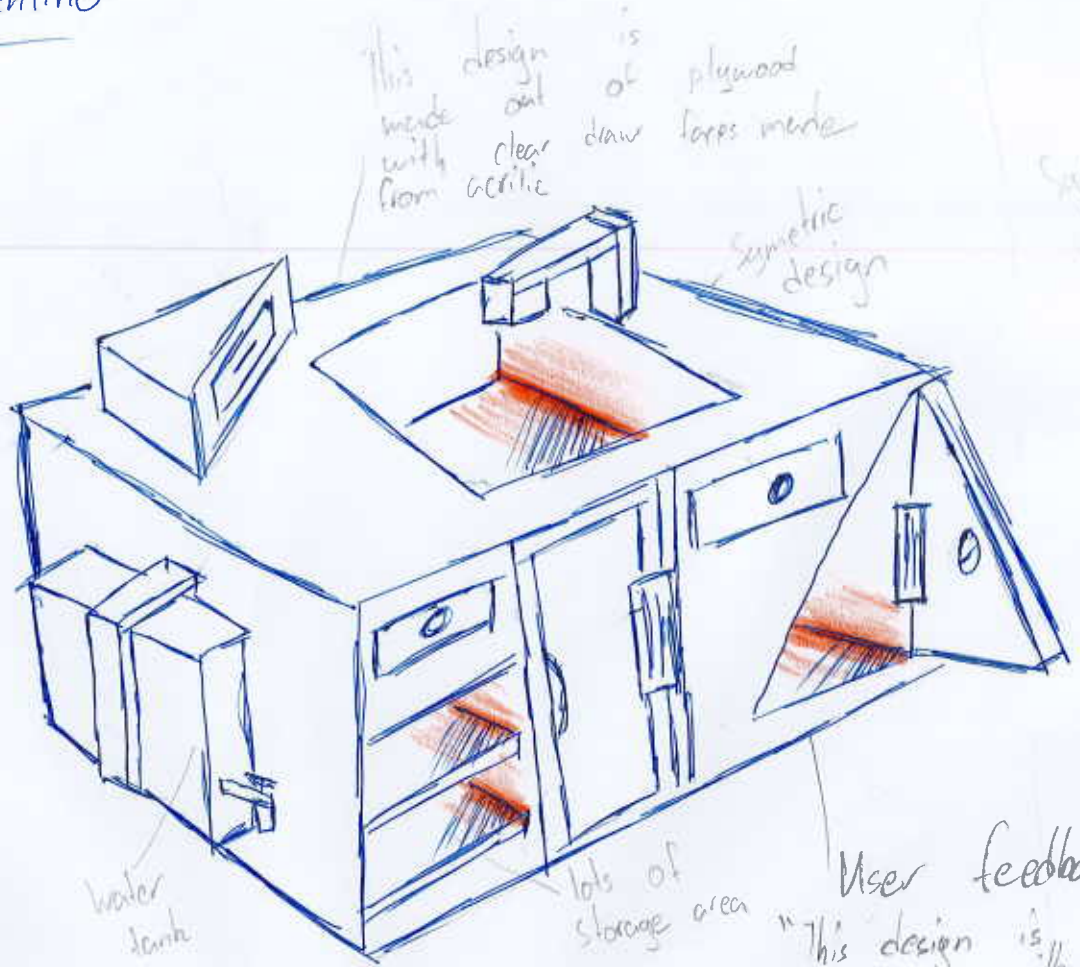
Exploded view, Internals of the design

Roller Draw system which means the items inside are very secure and won't fall out whilst driving

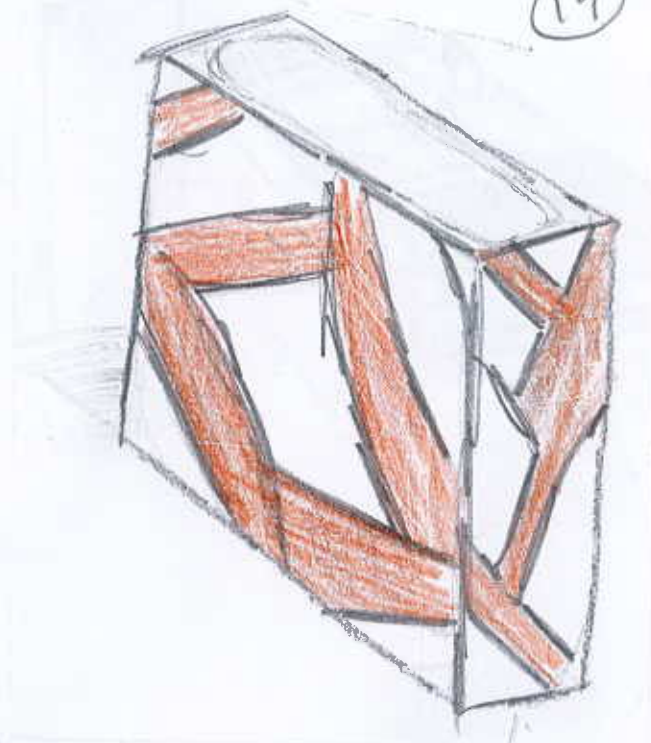
Pull out kitchen

Material Clear plastic top (easy to clean, smooth)





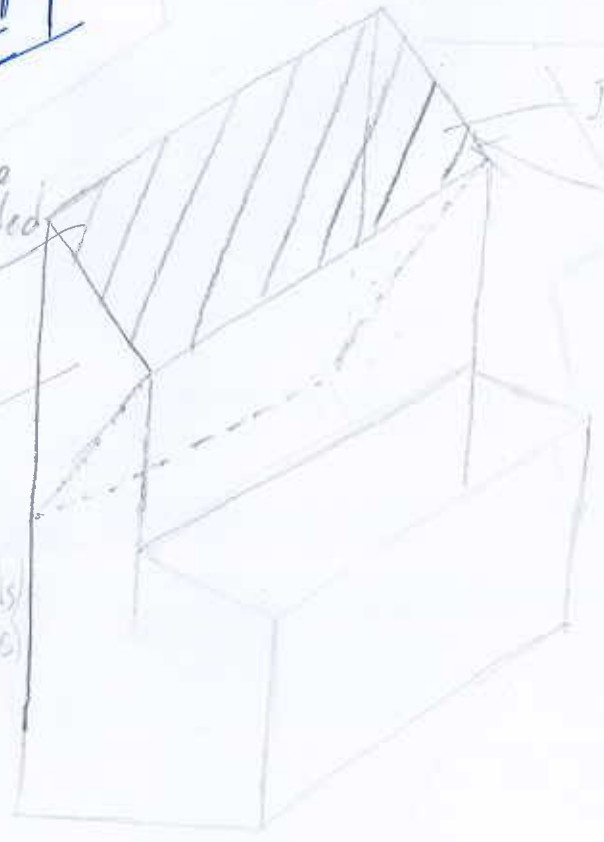
Wood table top  
Full glass gives a nice texture and matches the door mat in the van.



Inspiration  
Fence slats  
Natural pattern

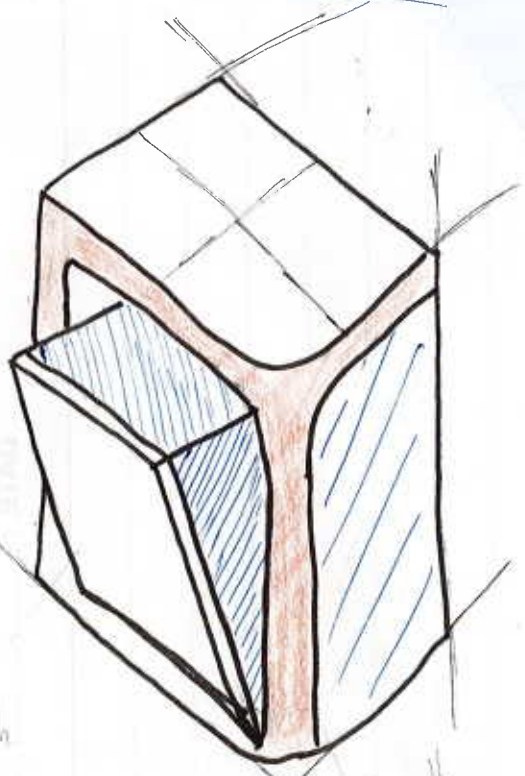
User feedback  
"This design is very busy with lots of storage however it does not use the full height of the van"

Large storage requested by end user.  
Elastic cord

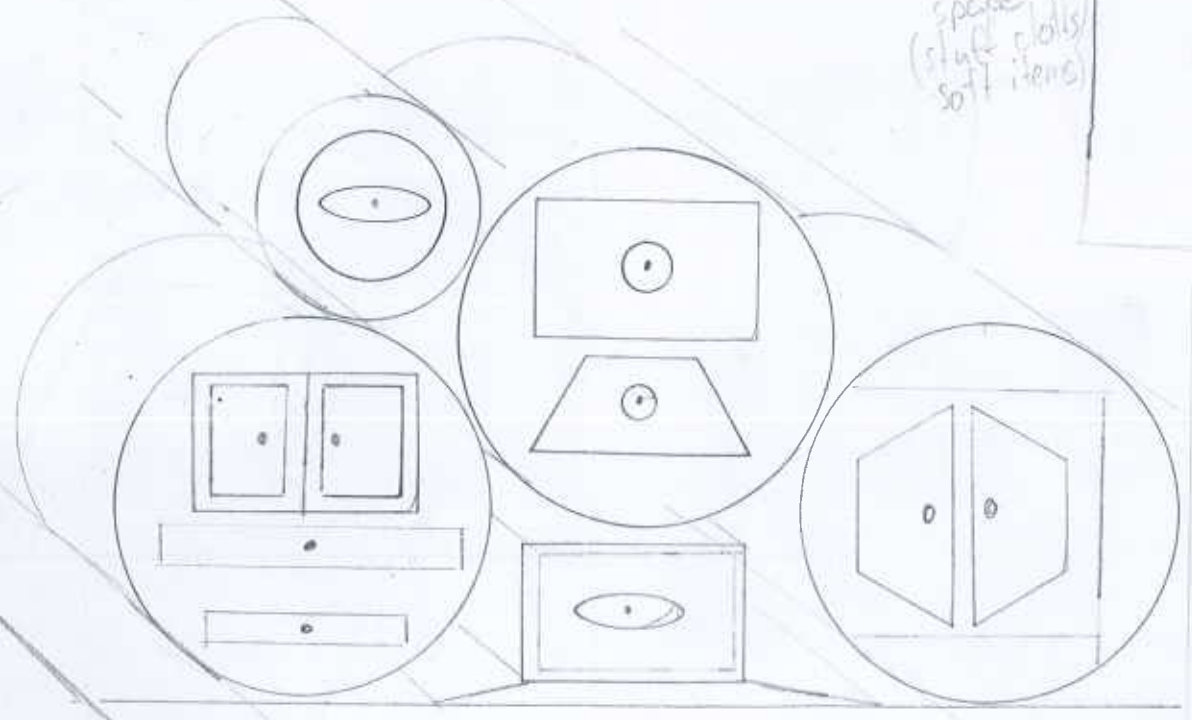


Follow storage space (stuff cloths soft items)

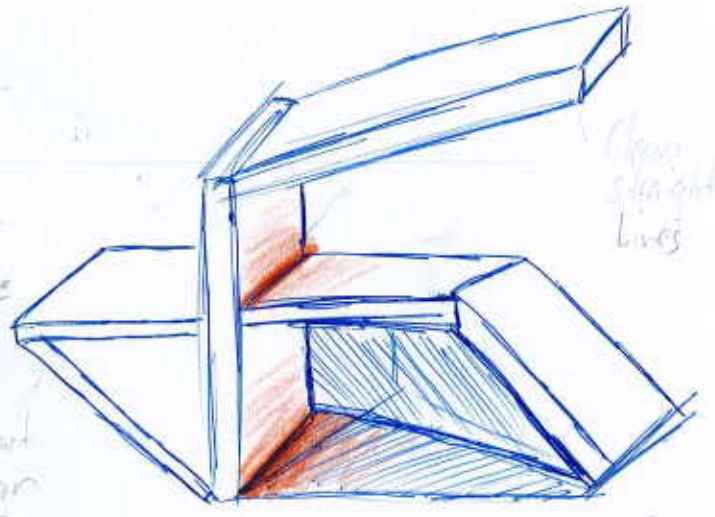
User feedback  
"I like the use of the space at the top of the cupboard this stuff area would be useful in the van"



Rubbish bin  
Smooth curved lines



Inspired by circular shoe storage



Asphalt design  
Clean straight lines