

# THE SPORTING ARENA

How can merchandise be used to promote a sporting situation?

Exemplar NEA

# Investigate

## The sporting Arena

How can merchandise be used to promote a sporting situation?

In this first section I will look at what Sporting Situations I could consider, what major world sporting events are taking place in 2018 and what current merchandise exists that has been used to promote sporting events such as London 2012 Olympics for example.

What do we mean by the terms '**The Sporting Arena**' and '**Merchandise**'?

### The Sporting Arena

An arena is an area, sometimes covered, designed to showcase performances ranging from music, plays and sports. However, the term generally refers to any venue which hosts some form of competition or sporting event.

### Merchandise

Merchandise is a business and marketing term. It refers to a product that can be offered for sale to satisfy a want or need.

### Major World Sporting events of 2018

- XXIII Winter Olympics – PyeongChang, South Korea
- Commonwealth Games – Gold Coast, Australia
- FIFA World Cup finals – Russia
- Ryder Cup

### Who are the users?

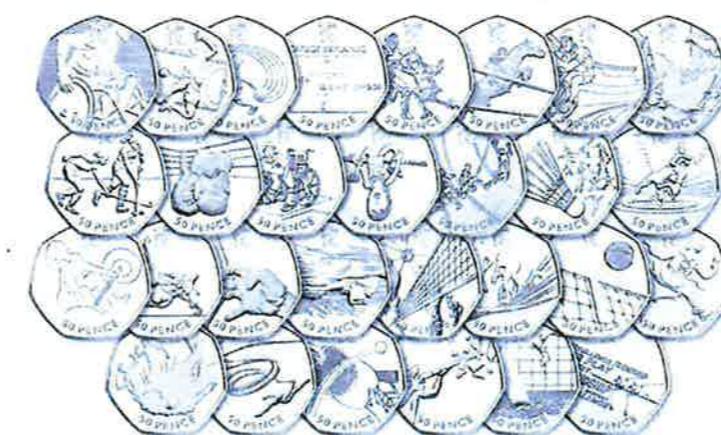
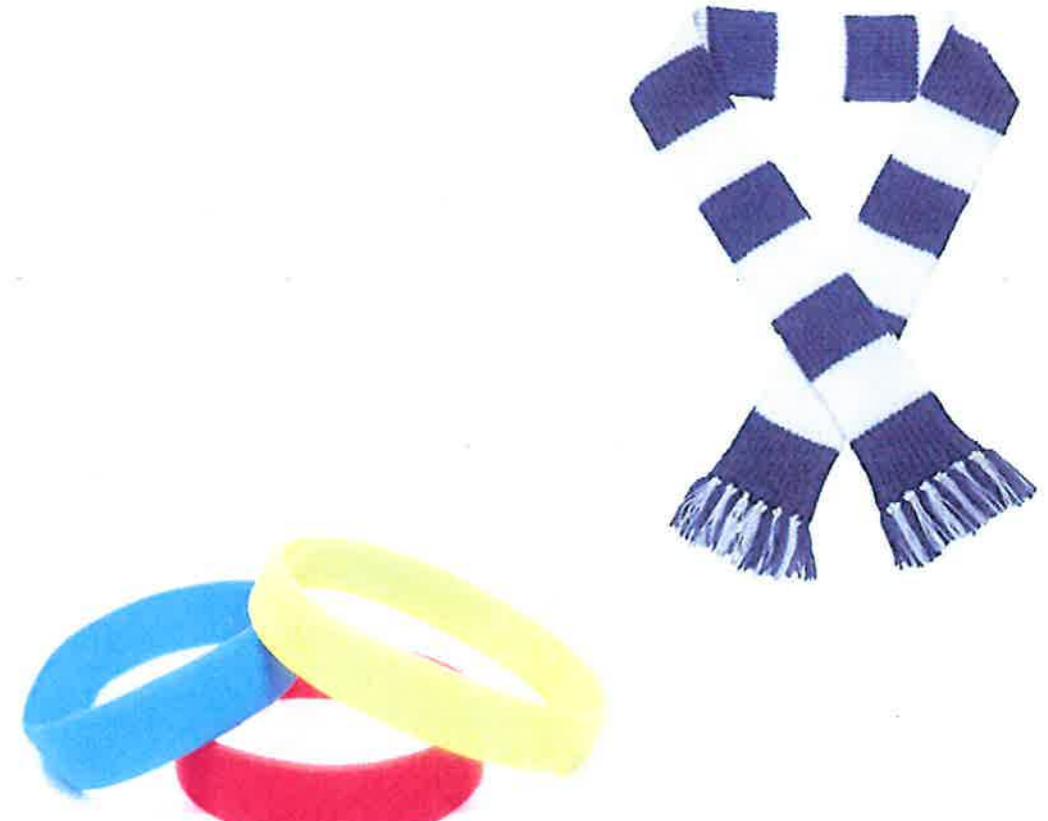
- Sports fans
- Collectors of memorabilia
- Athletes / competitors
- Worldwide / International bodies such as FIFA or IOC
- Host countries and cities such as Moscow, Russia

## Sporting Situations and Events

World	European	National	Charity	School based
<ul style="list-style-type: none"><li>• Invictus Games</li><li>• Ashes Cricket</li><li>• T20</li><li>• Rugby</li><li>• Olympics</li><li>• Football World Cup</li><li>• Tennis</li><li>• Hockey</li></ul>	<ul style="list-style-type: none"><li>• Tour de France</li><li>• Champions League</li><li>• World Track Cycling</li></ul>	<ul style="list-style-type: none"><li>• FA Cup</li><li>• Gold Cup</li><li>• Grand National</li><li>• Super bowl</li><li>• World Series</li><li>• Masters</li></ul>	<ul style="list-style-type: none"><li>• Disney Fun Runs</li><li>• London Marathon</li><li>• Colour Runs</li><li>• Mud Runs</li></ul>	<ul style="list-style-type: none"><li>• Inter Schools</li><li>• Daily Mail Rugby</li><li>• Henley Regatta</li></ul>

### Existing types of merchandise

- Programmes
- Scarves
- Badges
- Replica shirts
- Drinks mugs and coolers
- Stickers and sticker books
- Coins
- Stamps and FDCs
- Car stickers
- Bed covers and home furnishings
- Replica trophies and medals
- Signed merchandise
- Sweets
- Foam fingers
- Umbrellas
- Key rings
- Mascot dolls
- Wrist bands



## Who are the users?

In this particular Contextual Challenge, the term **users** is probably not the best term to be using. Since the task is related to merchandise, perhaps consumers, collectors or fans would be a better term used to describe the '**users**'.

As already identified on my first page, users could be grouped into several categories, with perhaps the most common user being sports fans themselves.

There will be certain groups, depending on what the merchandise is, who will purchase products and items since they will be collectors such as stamps for example, those who purchase as an investment or those who buy to sell on sites such as eBay.

The examples on this page show different types of sports merchandise which has been used to either promote or record a sporting event.

Major sporting events such as Wimbledon, sees a great deal of associated merchandise produced for sale; balls, sweat bands, programs and towels for example. Many of these will carry the Wimbledon logo and they will also be marked with a date to ensure that visitors and regulars buy each year, especially if they are collectors. Many spectators try to get these bits of merchandise autographed by the players they have watched. Guests to corporate boxes and tents will often be given the chance to buy raffle tickets to win signed merchandise provided by sponsors.



Host cities, such as London when they hosted the 2012 Olympics, used merchandise on a massive scale to promote the event and to generate sales income. It ranged from wrist bands to stamps, from duvets and matching curtains to mascots. The release of a set of themed 50 Pence coins was also very successful and they became highly sort after and collectable. The Royal Mail also released commemorative stamps for each Gold British Gold medal winner. The image to the above right shows what merchandise was given to athletes in their rooms on arrival at the Olympic village.



SPONSORED  
Framed Anthony Joshua Signed Photo: The Ali Pose Autographed Sports Memorabilia

£139.99

[Buy it Now](#)

Free Postage

Only 1 left!

6 Watching

Click & Collect

Sponsored listing on eBay of sporting merchandise and memorabilia.



Some merchandise is given away as a means to promote brand and team loyalty. An example of this would be the team flags at the Wembley NFL games like the ones shown on the right.

## Bobby Moore

Bobby Moore

[Click on title to view full description](#)



Add to Shopping Cart

1 1966 ENGLAND Signed Autographed Alf Ramsey Bobby Moore Envelope 1966 ENGLAND DOUBLE SIGNED Alf Ramsey Bobby Moore Football Team Autographed Envelope UK Signed As New Signed by Author A superb ORIGINAL UK 1966 cover envelope as issued to commemorate the England World Cup victory over West Germany. This beautiful original piece has been autographed by the captain and manager of the England team who played on that memorable day. Includes the very rare signatures of the late Alf Ramsey and Bobby Moore. HAND SIGNED Original AUTOGRAPHS from BOBBY MOORE and ALF RAMSEY. The envelope also includes the rare commemorative 4d stamp celebrating the historic 1966 World Cup. This scarce Alf Ramsey & Bobby Moore autographed item is stamp dated 18 August 1966, just 19 days after the memorable 30 July win. A wonderful commemorative issue for the 1966 World Cup which ran 11-30 July. A stunning set of highly collectable and rare signatures, more so when gathered together on such a lovely FDC. A remarkable piece of football history in superb condition. This piece would look amazing if mounted or framed. Accompanied by full RARE AND SIGNED hologram authenticity certification and insurance valuation of £800-£900. We can arrange framing of this piece if required. Price: 745.00 GBP



Add to Shopping Cart

2 1966 ENGLAND Signed Autographed Alf Ramsey Bobby Moore Envelope Incredible 1966 ENGLAND DOUBLE SIGNED Alf Ramsey Bobby Moore Football Team Autographed Envelope UK Signed As New Signed by Author A superb ORIGINAL UK 1966 cover envelope as issued to commemorate the England World Cup victory over West Germany. This beautiful original piece has been autographed by the captain and manager of the England team who played on that memorable day. Includes the very rare signatures of the late Alf Ramsey and Bobby Moore. HAND SIGNED Original AUTOGRAPHS from BOBBY MOORE and ALF RAMSEY. The envelope also includes the rare commemorative 4d stamp celebrating the historic 1966 World Cup. This scarce signed Alf Ramsey & Bobby Moore autographed item is stamp dated 18 August 1966, just 19 days after the memorable 30 July win. A wonderful commemorative issue for the 1966 World Cup which ran 11-30 July. A stunning set of highly collectable and rare ENGLAND 1966 signatures, more so when gathered together on such a lovely FDC. A remarkable piece of football history in superb condition. This piece would look amazing if mounted or framed. Accompanied by full RARE AND SIGNED hologram authenticity certification and insurance valuation of £800-£900. We can arrange framing of this piece if required. Price: 745.00 GBP

Some older merchandise, in this case from the 1966 football World Cup which England won at Wembley, is now worth a considerable amount of money. The examples pictured above are stamp FDCs which were signed by the captain of the England football team, Bobby Moore. Both of these examples are for sale at £745. These would have been purchased by sports fans or stamp collectors, but in any case they have turned out to be a very good investment. This particular type of merchandise was used to both promote and mark this sporting event.

Football events such as the FIFA World Cup (Russia 2018) and the Premier League, promote the competitions and events with the release of collectable and swappable stickers. These are sold in packets with the stickers being put into a booklet. Doubles can be swapped and more often than not now, missing stickers can be purchased on eBay for example. These products are sold under licence, which means companies can use pictures of logos and images of players without any copyright issues.

## Summary of the needs of the user

Given this initial bit of research into existing forms of sporting merchandise, it is clear that much of the merchandise is produced from a collectors / collection point of view. It is clear therefore that the product must have some form of perceived value.

## Investigation of existing products

The information on this page shows a range of existing sporting merchandise from a number of different sporting events. I have evaluated them against a set of criteria.

Stella McCartney is a well-known fashion designer. She designed the team kit for Team GB. It was controversial in some respects because although it essentially depicted the Union Jack flag, the colour red was missing. Stella McCartney was reported to have said 'the flag is one of the most beautiful flags in the world and it was important for me to stay true to that iconic design but also to modernise it and present it in a contemporary way.'

Much of the kit will be available to buy through official channels. One such item is a replica football shirt at a cost of £50.

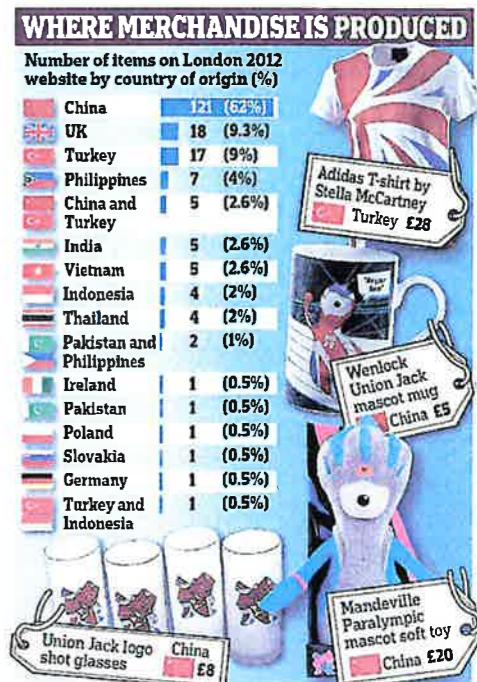
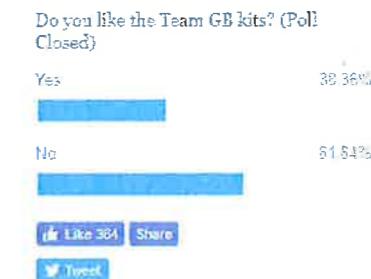


It is important to consider in any design and technology activity issues such as the transportation of goods around the world. The table on the right shows where the merchandise for the London 2012 Olympics was made. With China producing more than 60%, there would have been a huge carbon footprint in terms of transporting these goods to the UK.

It is also worth noting that some merchandise might well have been made a 'fake' rip-offs. The image below shows an official merchandise stall.



The image to the right shows a poll taken through social media as to whether people liked the Team GB kit. The results speak for themselves. Although there is no specific information as to why, I think that fact that the red was missing from the flag was a major factor. It is important therefore that when using National icons such as the flag for example, it is important to stay true the original concept.



	Wool football scarf	Silver Key ring	Papers and board board game	Polymer drinks bottle	Timber rattle
<b>Client / user requirements</b>	The user would wear this scarf to show their loyalty and support for their football team. It can also be worn to keep their neck and back warm in the cold.	This would be a high end gift / purchase because it is made from silver. It would be a luxury item and as a gift it would be given based on sporting likes.	The rules are the same for this game it is just that the context changes and it has been adapted by many sporting teams and events.	These bottles are easily moved in the carrier. It is carried onto the field during breaks so that the team can have a drink.	This is an old-fashioned toy. It was used many years ago on the football terraces to create noise as it was swung around.
<b>Performance requirements</b>	The particular material will trap air and keep the warm in.	This is more of a luxury item but to have keys attached to the ring at the top.	This long lasting board game should be durable in terms of the life of the cards and board used.	It is easily drunk from and washed and refilled. The polymer is lightweight and tough.	As the rattle is swung around it makes a noise as the cog strikes against a piece of material.
<b>Aesthetics</b>	The scarf includes the team badge and name and is in team colours.	The key ring is small and includes a very detailed miniature of a type of ball used in sport.	The board and package includes bright colourful images reflecting the context of the game.	This product could be printed on to show the team name. It could also be produced in different colours.	
<b>Consideration of innovation</b>	There is not any real innovation in this product as scarves were around in Ancient Rome.	Nothing really innovative here but there is a great deal of detail on the featured ball.	A well tested concept here so the innovation comes from the context of the area.	This is more of a functional product that anything else so little innovation.	A very old product which has been updated her with the use of different colour stains.
<b>Materials and components</b>	The scarf has been knitted in wool. Wool is a natural material and is easily dyed.	This is likely to be silver plated rather than solid silver due to the price.	A combination of folding boxboard, polymers and die cast metals for the small figures.	The bottles will be blow moulded from LDPE. The holder is likely to be ABS which is a bit tougher.	The rattle would be beech and the dowel holder ramin, a hardwood.
<b>Sustainability</b>	Wool is a natural material and is sustainable because it comes from animals such as sheep.	Silver is a pure metal and expensive due to its scarcity and cost of extraction.	Papers are boards are made mostly from wood pulp, some of which is from recycled sources. New material relies on chemical bleaching of wood pulp.	Polymers are not very sustainable due to being made from oil and they are quite difficult to recycle unless separated out into specific plastic types.	The timber is quite sustainable if sourced from an FSC source. New timber can be grown but it does take a long time.

## Market research

It is important to gather some research from users and potential users and so I have spoken to two people who have run half marathons but also love a range of different sports. Both have been to big games and matches in USA such as NFL and NBL.

Hattie has run two half marathons in USA, both at organised Walt Disney events and she is preparing to run a full marathon next year. James has run a half marathon as well in USA. Both have been to big matches whilst travelling in the USA.

When I spoke to them both, they said how much merchandise Disney produced to mark and celebrate the events. They both commented that the medals they got for finishing were amazing.

Every year, Disney produce a great deal of merchandise for collectors and participants. All of the merchandise features Disney characters and some generally every years, hats, tea towels and pins are produced along with a new medal. The ribbons the medals hang on are also themed.

In summary the medals were the overwhelming favourite of both James and Hattie although they did both come back with other bits of Disney merchandise. The medals were awarded for completing the event so in some respects it is not 'true' merchandise but in a way it did promote the event and they are both keen to return to do more. James is thinking about the London marathon too.



A selection of merchandise from 2013 and the 2016 Food and Wine Half Marathon Medal

Serious runners and fans have completed numerous events. These medals have been framed up with a small engraved plaque at the bottom giving details of the races they were awarded for.



In order to further my understanding of what merchandise people collect and why, I spoke to several other sports fan, some who take part and some are keen watchers of sporting events.

Mr Tomlinson, a DT teacher, is a fan of the Tour de France. He follows it on the TV when he can. He rides quite often on his own bike, sometimes up to 50 miles and he has taken part in a few bike races. Although he is not a typical collector of sporting merchandise, he does own several bits of cycling clothing most of which are branded tops such as Team Sky. He also has a replica 'Yellow Jersey' as would be worn by the leader of the Tour de France.

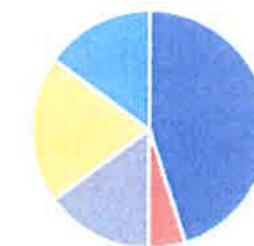
I spoke to my PE teacher who is a very keen runner and is hoping to represent Wales at the forthcoming Commonwealth Games in 2018. He naturally has a collection of medals and representative vests having run for Wales at various competitions and events. He enjoys receiving the medals and says they are a bonus but he also views them as something that he collects.

I was keen to find out what type of merchandise people bought and why, so I asked 20 adults, who were known sports fans, the following few questions.

What do you buy?

1. What do you buy when you attend a sporting event?

- Programmes
- Scarves
- Souvenirs
- Collectables
- Limited edition items

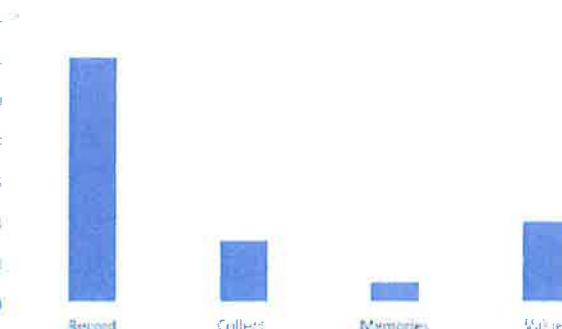


\* Programme \* Scarf \* Souvenir \* Collectable \* Ltd edition

2. Why do you buy merchandise at sporting events?

- Record of attendance
- Collect items
- Memories
- Value / investment

Why do you buy?



As I continued the discussion with these 20 people, several of those surveyed said they would like to take part in the London marathon but they went on to say that they were not runners and could never see themselves being able to take part. This got me thinking a bit as to how I might be able to come up with some ideas to get people involved who were not runners. One of the major attractions of the London marathon is for runners who raise millions of pounds for charities.

In summary at this point I am going to further research into the Run Disney experience and into the London Marathon as potential events to create some merchandise for.

## Investigation into existing products including the work of others

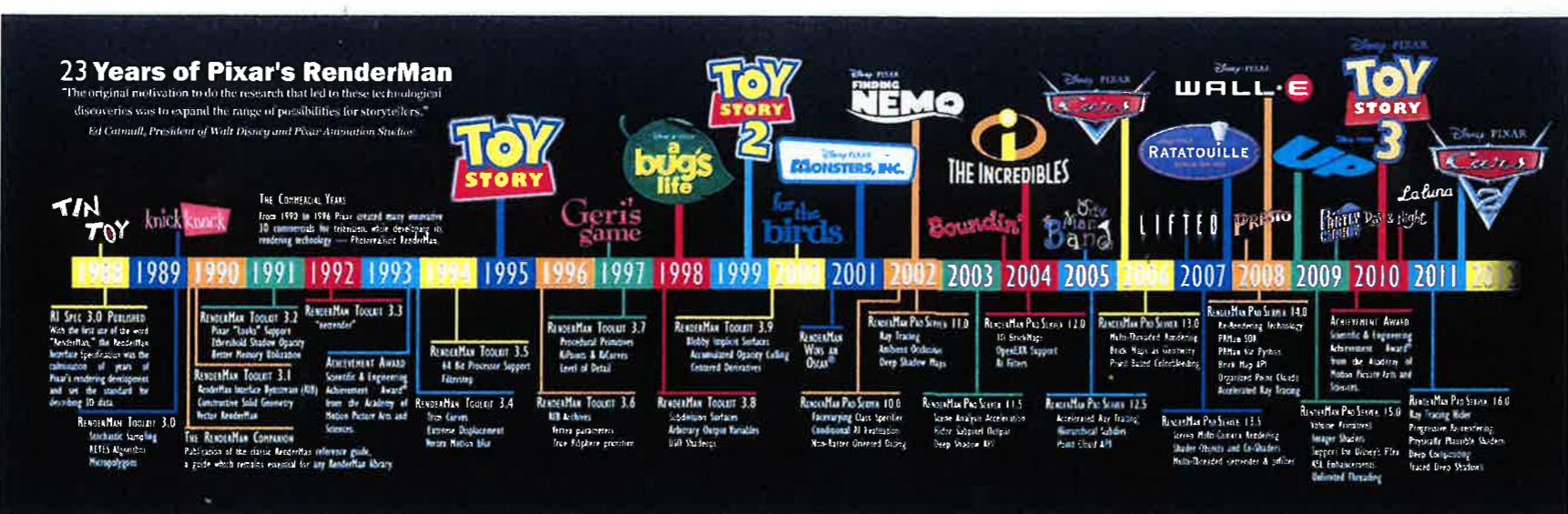
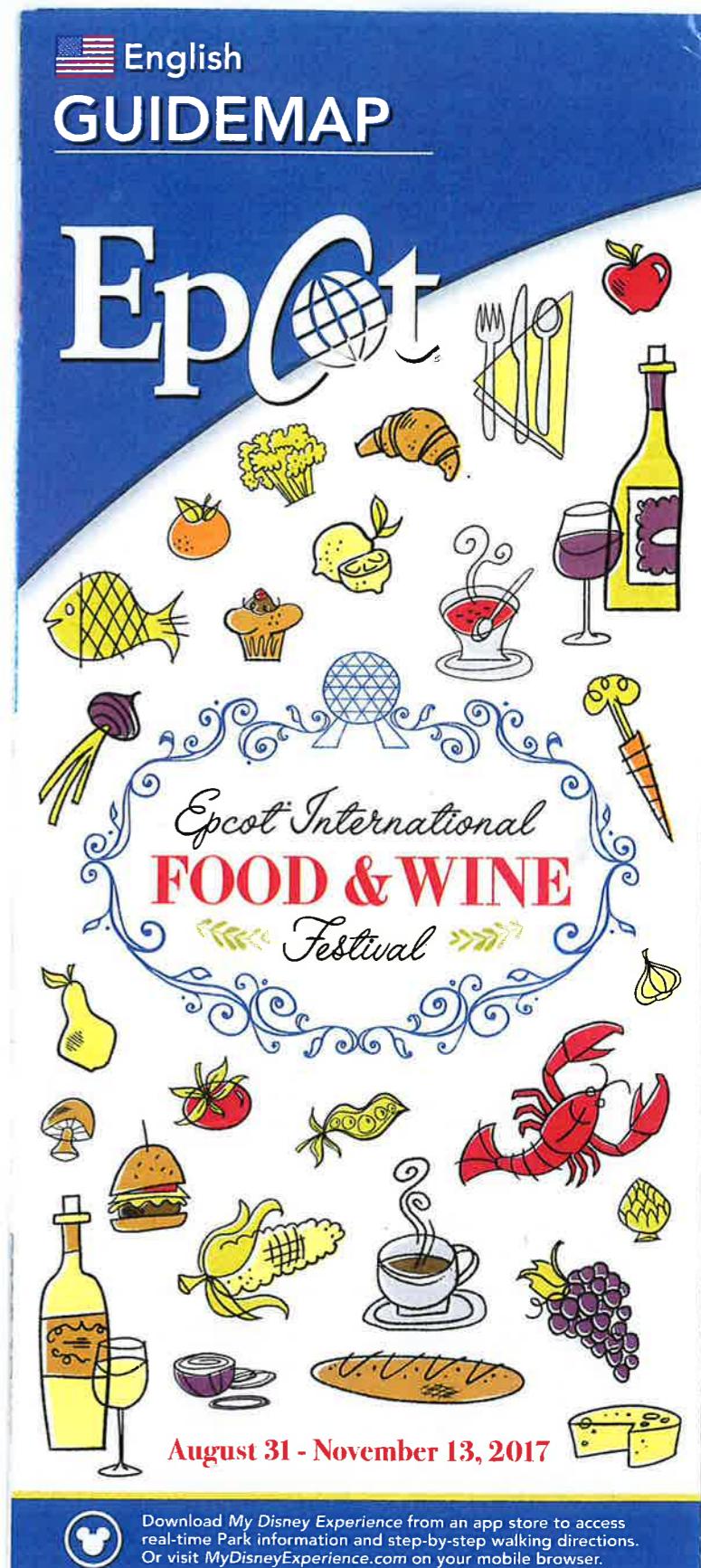
Run Disney events take place several times a year, mainly in Florida with one or two other events taking place in different Disney Parks around the world such as Disneyland Paris and Disneyland in California. At one of the major events, the EPCOT International Food and Wine Festival, several runs take place over the same weekend, with a 5K, 10K and a half marathon. This is a themed event given it is on at the same time as the Food and Wine event which runs for several weeks in the autumn. If you complete all 3 events you get an extra medal.

Pixar, a Disney owned company, started in 1979 when **George Lucas** of Star Wars fame, wanted to develop state-of-the-art computer animation. In 1983 **John Lassiter**, an animator, was invited to do some work freelance for the company. In 1986, **Steve Jobs** of Apple, bought the company from George Lucas and set it up as an independent company called 'Pixar'. It employed 40 people at the time. **Luxo Jr.** a short animated file featuring an angle poise lamp was made and it went on to be the first three-dimensional computer animated file to be nominated for an Oscar®. In 1991 Disney and Pixar announce that they are to make at least one computer-generated movie and work was started on a project that would turn into a **Toy Story**. It was not until 1995 that the film was released, going on to gross over \$362 million dollars worldwide. Disney and Pixar then agreed to make more movies over the coming years including A Bug's Life, Toy Story 2, Monsters INC, Finding Nemo, The Incredibles and Cars. The graphic at the bottom of this page shows a timeline of the key stages in the company and a list of the films Pixar have produced along with key milestones in terms of technological and software developments. Many of these films have had spin-offs in terms of merchandise and many have been featured as themes for Run Disney events.

In summary here, I like the concept of having a theme to an event and bringing in an element of brand identity, consumer loyalty. It is also good how they make use of existing resources such as the Disney Theme Parks and the wide range of Disney characters.



The image above shows the route through EPCOT, one of the 4 Disney Parks in Florida.



[https://www.google.co.uk/search?rlz=1C1GCEC\\_enGB761GB761&biw=1366&bih=662&tbo=isch&sa=1&ei=4flOWueOBuqQgAaujp7QDg&q=Pixar&oq=Pixar&gs\\_l=psy-ab.3..0l10.1185988.1187691.0.1189387.5.5.0.0.0.278.658.4j0j1.5.0....0...1.1.64.psy-ab..0.5.657..0i67k1.0.lsthKV4\\_EHA&safe=active&ssui=on#imgrc=qen3DLPlkUB9bM](https://www.google.co.uk/search?rlz=1C1GCEC_enGB761GB761&biw=1366&bih=662&tbo=isch&sa=1&ei=4flOWueOBuqQgAaujp7QDg&q=Pixar&oq=Pixar&gs_l=psy-ab.3..0l10.1185988.1187691.0.1189387.5.5.0.0.0.278.658.4j0j1.5.0....0...1.1.64.psy-ab..0.5.657..0i67k1.0.lsthKV4_EHA&safe=active&ssui=on#imgrc=qen3DLPlkUB9bM)

## Research into the context in which the prototype will be used.

Given the comments from earlier in the research section where several of those questioned said they would like to take part in the London Marathon but they could not see themselves running in it, I thought I would take a look at the history of the event.

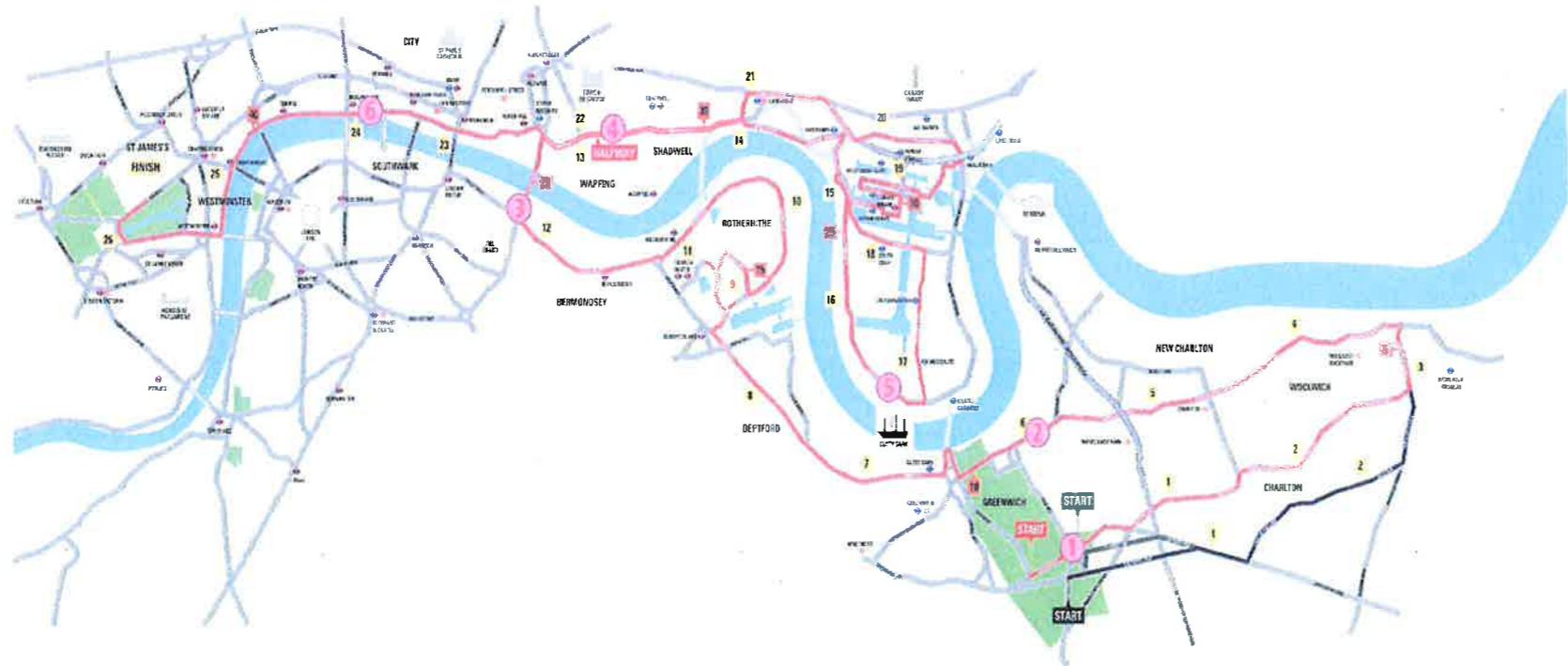
The first London Marathon was run in 1981 after some runners had taken part in the New York marathon and they said I wonder if we could do this in London. The race has now been run every year since and is now part of the World Marathon Majors.

The course starts in Greenwich Park, with several starting locations. For different ability racers. The very large majority of participants are made up from fun runners who raise millions of pounds each year for different charities.

The race around London takes in many of its famous landmarks; the River Thames, Old Royal Naval College, Cutty Sark, Docklands, Tower Bridge, Canary Wharf, The Embankment, The London Eye, Big Ben and Buckingham Palace.

### The London Marathon in numbers:

- The race is run over 26 miles, 385 yards
- The event had raised over £450 million by 2010
- In 2009, £47.2 million was raised and was the most amount of money raised in a single event
- 6,747 run in the first marathon in 1981 and in 2010 36,549 crossed the finishing line
- In 1983 the first wheelchair race took place
- Over 150 doctors provide medical cover
- 1500 volunteers of St John Ambulance provide healthcare



I am beginning to think that there are a number of opportunities for me to be able to design some merchandise to promote the London Marathon for 2018 and in doing so to be able to raise additional money for charity. The merchandise will be aimed at those people who I spoke to earlier in the research who said they would like to support and take part in the event but without being able to run in the race.



Personalised products are often produced after the event. In this example, the runner's time is recorded and the medal displayed. Many charities will support runners with merchandise such as tee-shirts which carry logos and messages such as this example for the British Heart Foundation.



## Research into possible materials



The picture on the left shows a merchandise stall for the London Marathon. There are many examples of different items manufactured from a range of materials.

**Ceramics:** Mugs are made from ceramics which are inorganic, non-metallic materials. Ceramics are brittle which means they will break if you drop them onto a hard surface. They are capable of withstanding high temperatures and can withstand chemicals allowing them to be washed up safely with detergents.

**Teddy Bear:** Commercially made teddy bears are made as toys. They are often made from synthetic fur.

**Note book:** Come in a range of sizes and of different qualities. Often bound in a different materials such as heavier weight card, fabric, leather or even plywood for example, the cover provides a stiff protective layer to the lighter weight paper inside. Most commercial paper is produced from wood pulp with new material having to undergo a bleaching process to make it useable. This bleaching process can be damaging to the environment.

**USB Stick:** This would be a standard internal flash drive component but would be housed in a polymer casing, such as ABS or HIPS. With these polymers being made from oil, it puts a demand on finite resources.

It is difficult at this stage to undertake too much research into materials as I do not know what I will be designing. It is however very important to consider the use of materials in any design and technology activity. Consideration must be given to where the materials originate from, the sources used to make them, the processes that are used to convert them and how they can be recycled or re-used at the end of their useful working life. In summary it is important to carry out a life cycle analysis of the materials used.

## Outline of the design problem from the context provided

In summary and in response to the contextual challenge of using **merchandise to promote a sporting event**, I am proposing to design and make a prototype product to promote and raise valuable funds for charities and good causes for the 2018 London marathon.

The product will be aimed at users who are keen to get involved in the London Marathon but without being able to run in it.

The main purpose and function of the product is to raise awareness of the London Marathon and to raise money. Any product must be safe to handle and use and must conform to specific safety standards and legislation. The product should also be shaped or styled so as to relate and be associated with the London Marathon.

# Product Specification

## Research Findings

I have found out:

- A lot of people enjoy watching and taking part in sports
- Programmes are the most popular form of merchandise that is bought at sporting events but this is mostly likely to be football and rugby matches
- I need to be mindful about where products are produced because of transportation issues of products around the world
- Themed products such as those produced for the Run Disney events are very popular
- Products such as the medals given for completing events like Run Disney and the London Marathon are very popular and treasured by those who compete in the events
- People would like to be able to contribute and take part in the London Marathon but without wanting to or being able to run it in
- Much of the merchandise produced for the London Marathon is used to help raise money for various charities
- Some limited edition and signed merchandise attracts very high prices

## Problem

Lots of people would like to be able to take part in the London Marathon but without being able to run in it.

## Design Brief

I am going to design and make a prototype of a product that can be used to help promote the London Marathon 2018 for non-runners and at the same time raise money for charities.

## Users

The users of this product will be sports fans and supporters of charities.

## Form:

- i. The product should reflect the theme of running
- ii. It should reflect the capital city and London landmarks
- iii. It should be easy to handle
- iv. It should be easy to stack so it can be transported both internationally and locally

## Function:

- i. The product should be capable of capturing the users imagination and interest of potential users
- ii. It should be used to raise money for national charities and good causes
- iii. It should be used to promote the London Marathon of 2018

## User requirements:

- i. It should try to involve users in helping out / raising money for charities involved with the 2018 London Marathon
- ii. It should be easy to handle and use
- iii. It should be something that can be used and enjoyed
- iv. It should be low maintenance

## Performance requirements:

- i. The product should reflect the theme of running
- ii. It should be easy to open, use or store
- iii. The product should be clearly marked / labelled with any relevant info / legal requirements
- iv. Any weights and measures should be clearly shown
- v. Any packaging should protect the product during transportation

## Materials and component requirements:

- i. The product should use as few different materials and components so as not to place a high demand on resources in terms of materials consumption and that might make it difficult or too complicated to recycle
- ii. It should be made from locally sourced materials and components
- iii. It should be easy to separate different and mixed materials / components for recycling purposes

## Scale of production:

- i. It will need to be mass produced as it will be used to help raise money for charity on a large scale
- ii. It should be easy to handle

## Cost:

- i. It should be no higher than £10 with a proportion of that going to good causes
- ii. The product should cost as little as possible so as much profit goes to the charities and good causes

## Sustainability:

- i. The product where possible should use recycled materials and as few different materials / types of materials as possible
- ii. The product should be kept to a minimum size if at all possible to reduce the demand on resources and to reduce the volume of any

The specification points coloured above are those that can be used objectively test and evaluate the product, both during the design stages, the final design proposal and during the testing and evaluation stages. **Technical, Measurable, Justified from research and Sustainable**

## Design Ideas

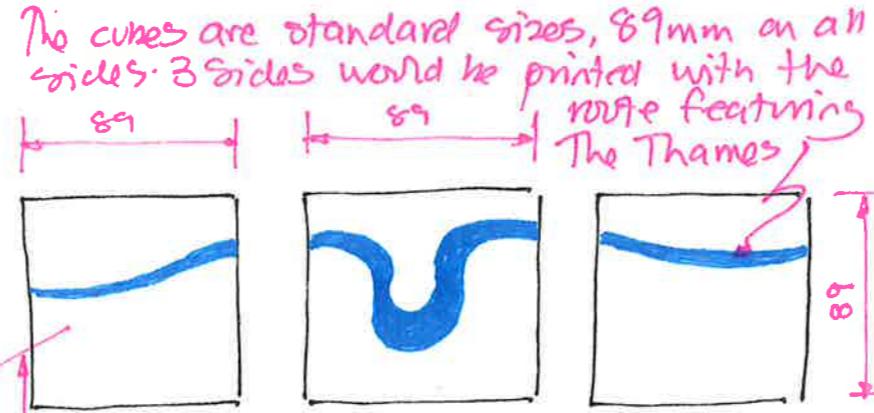
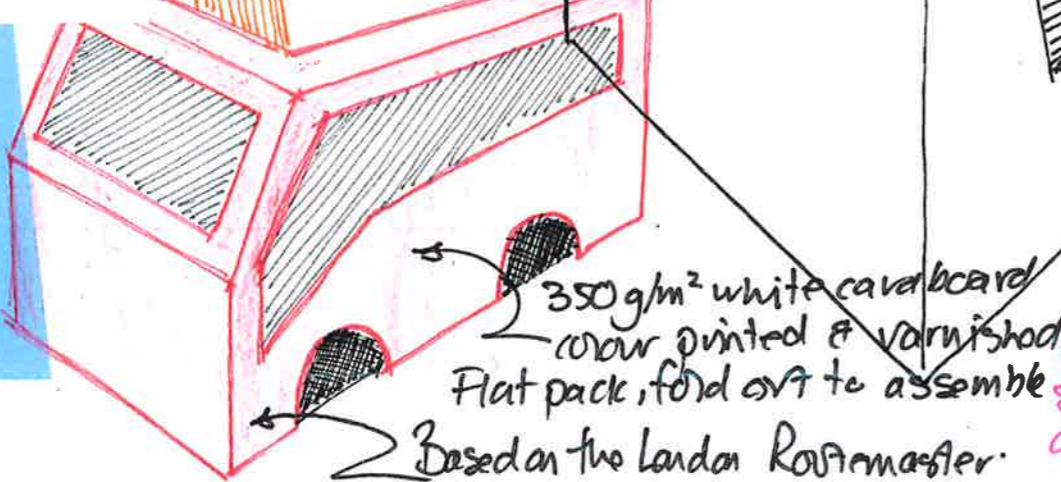
Branded 'momo' blocks are a neat little way of promoting events. Low-cost + high volume they can be printed to specific client needs. In this case they would show Mo Farah on the paper.



The photograph above shows a quick 'sketch' model. I used blue foam and then stuck a printout of two Marathon route over the sides (all 4). The top is difficult to see but it has the Mo Farah ghost image over the top.



Standard size 89x89 paper squares.



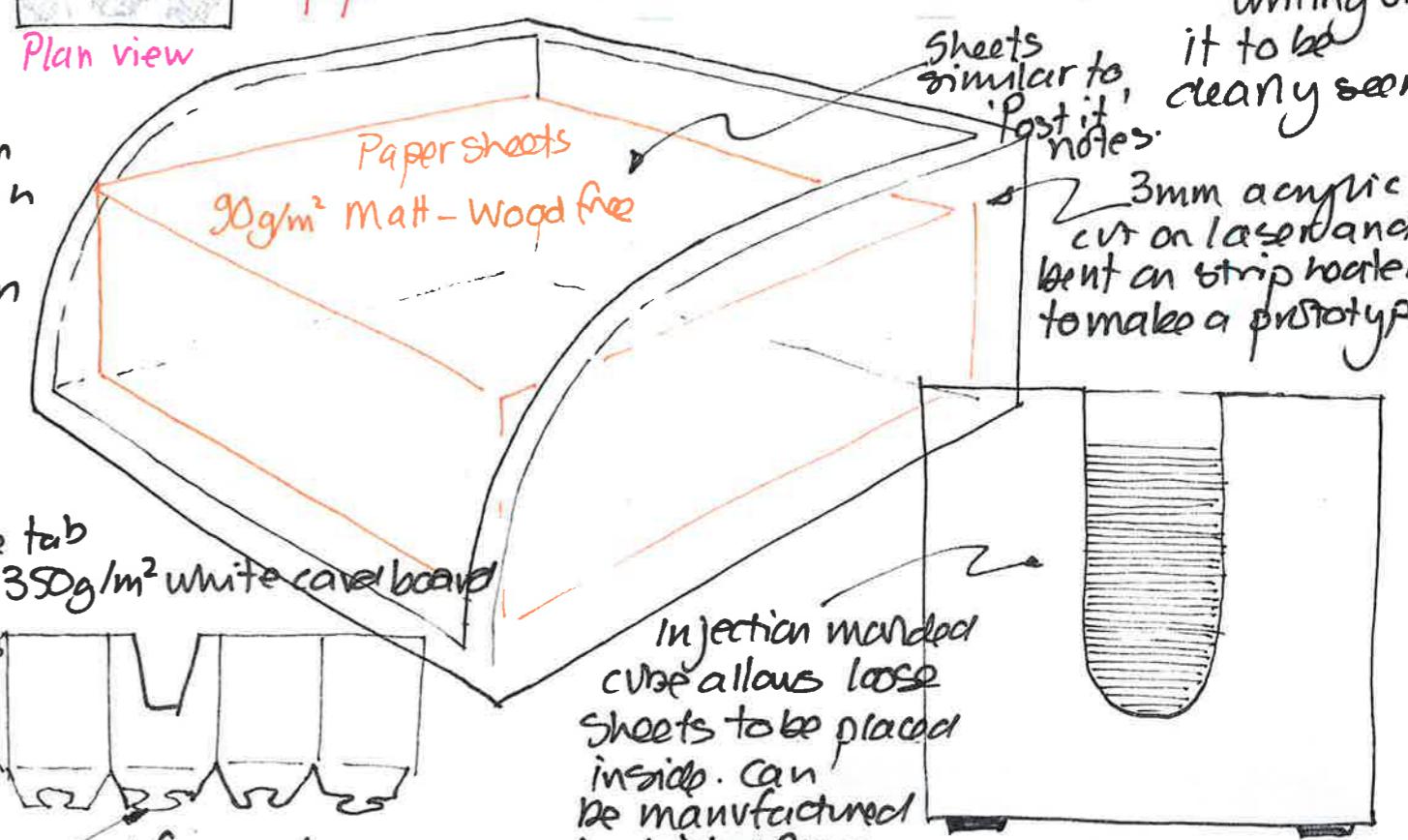
The rear edge would be glued to hold all the sweets together.

Plan view

Use of 95% transparent watermark to be printed onto note paper

Other London Landmarks such as St Pauls, City Hall and London Eye can be on the printed surface.

100% recycled paper - Chlorine free, FSC certified

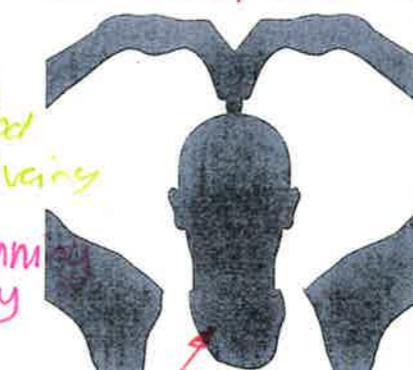


I have copied an image several times and changed the transparency. 95% Transparent would be ideal like the "Underground" logo above.

95% Transparent

2 Cube shaped is easily packed/stored for transportation reducing volume.

Sir Mo Farah is planning to run in the 2016 event. Any use of his image/s would be subject to copyright/licence agreements but could be part of a sponsorship deal.



95% Transparent

50% Transparent

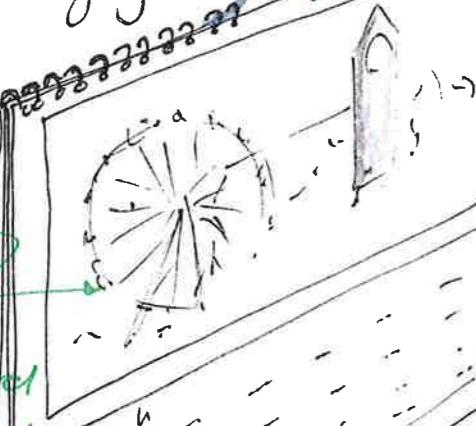


This Underground note block is an example where the logo has been ghosted out so it does not appear too heavy and allows any writing on it to be clearly seen.

3mm acrylic cut on laser and bent on strip heater to make a prototype

# Design Ideas

Answers for wall  
hanging.



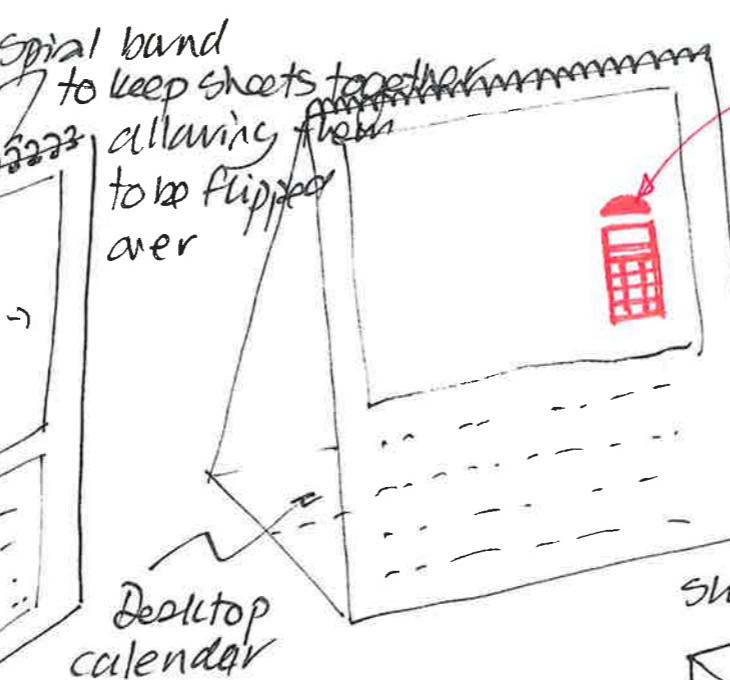
Calendar  
world needs a  
corrugated card  
either & world  
also need to  
be wrapped in  
something like  
cellophane to protect it.  
Lots of different materials.

Calender could be sold to promote the Marathon. They would also serve as a good way to promote London to home & overseas visitors. Dates would be combined with postcard images and icons of London.



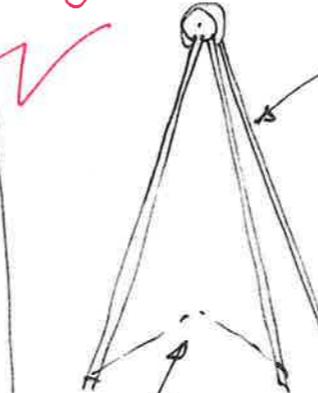
Mon	Tues	Weds	Thurs	Fri	Sat	Sun
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

An example of a page of parts. This would be of size to fit into the CD.



50g/m<sup>2</sup> White Standard A6 size  
Gloss card / colour printed postcard  
Printed double sided with

## Stylised London Icons

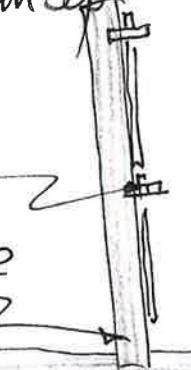


Printed double sided  
so only 6 sleeves/pages  
are required :- reducing  
overall cost & weight.

Flips over to share  
next month.



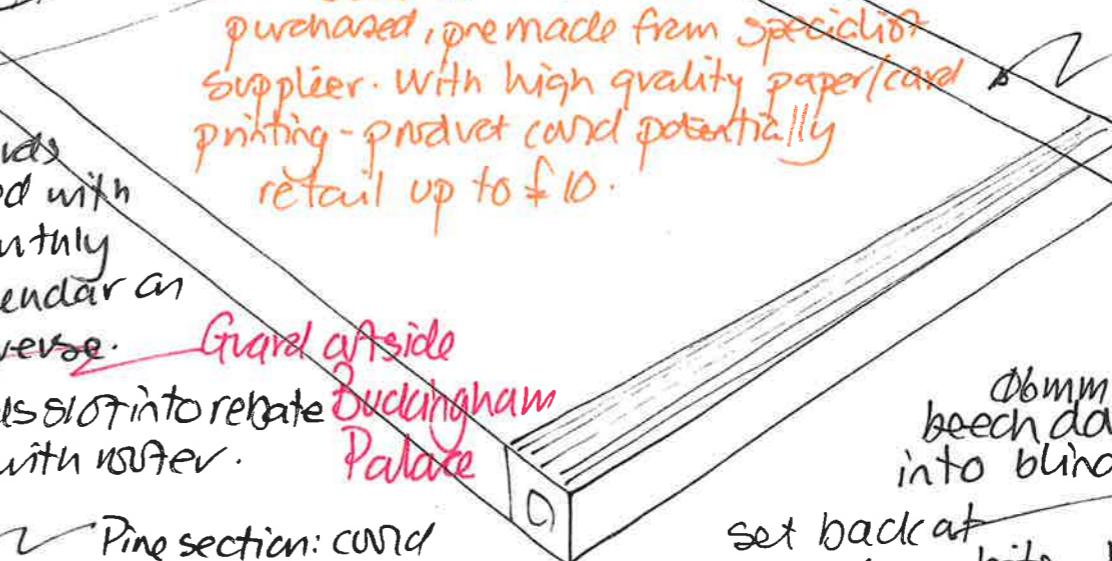
~~CD cases containing the card insets are graded into boxes for transportation when on display in the shops one can be opened like this the image above.~~



CD cases  
without the  
internal sleeve.  
Available wholesale  
from 35p.



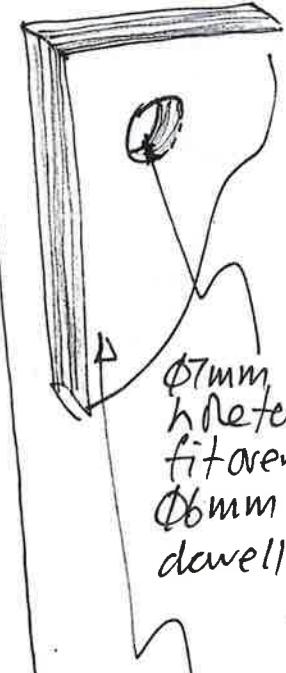
Mitre joint with PVA to make corner joint.



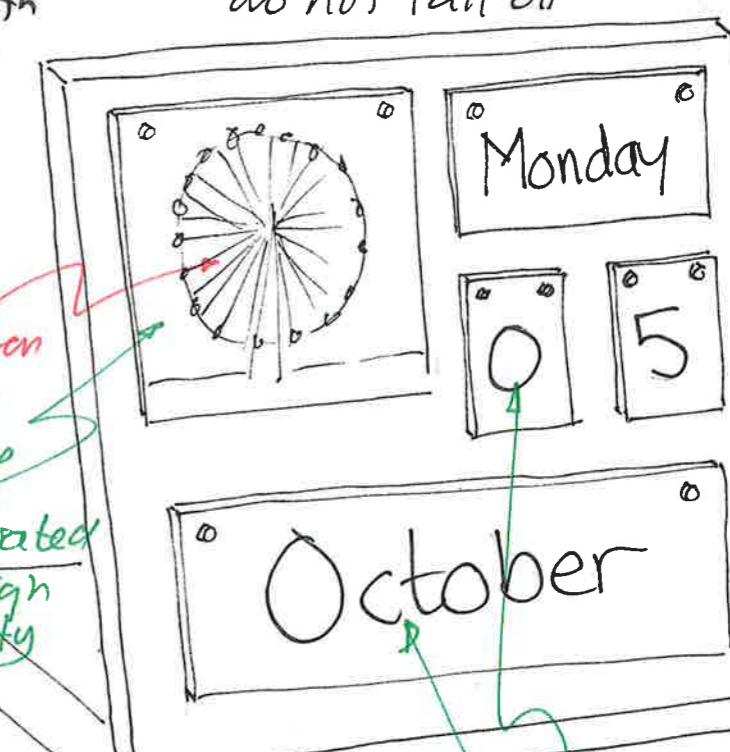
monthly calendar at  
reverse.

This padded world  
be difficult to transport  
because the cards would  
need support either side  
to stop them being bent.

Jewel case would be purchased, premade from specialist supplier. With high quality paper/care printing - product could potentially retail up to £10.



~~Z~~ Double-sided  
printed London  
landmarks - slip  
inside empty CD  
case.



Sublijet images  
printed onto  
polyester coated  
material ~~high~~  
gloss-quality  
finish.

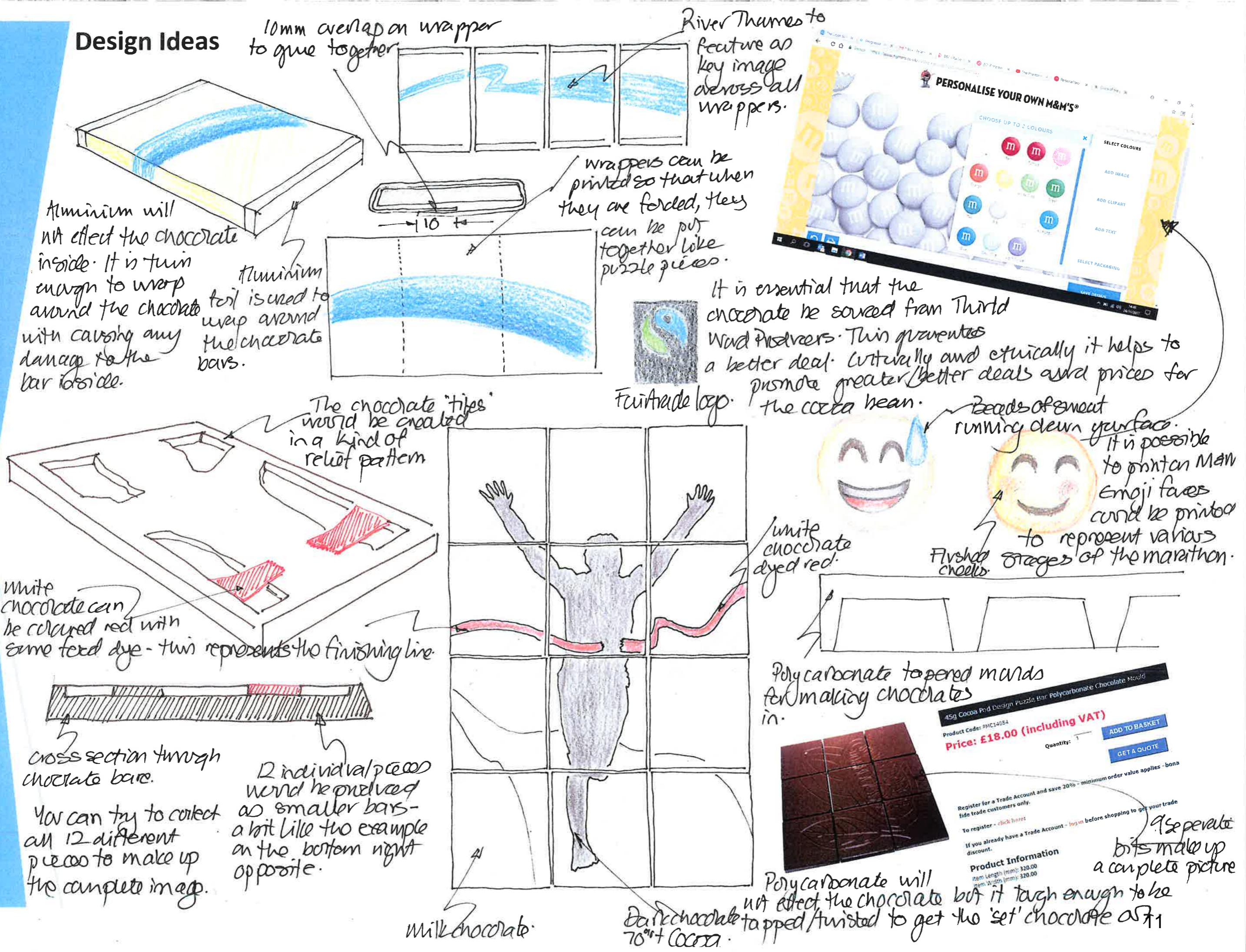


Rather than a calendar promoting London and landmarks this is a countdown calendar to racy

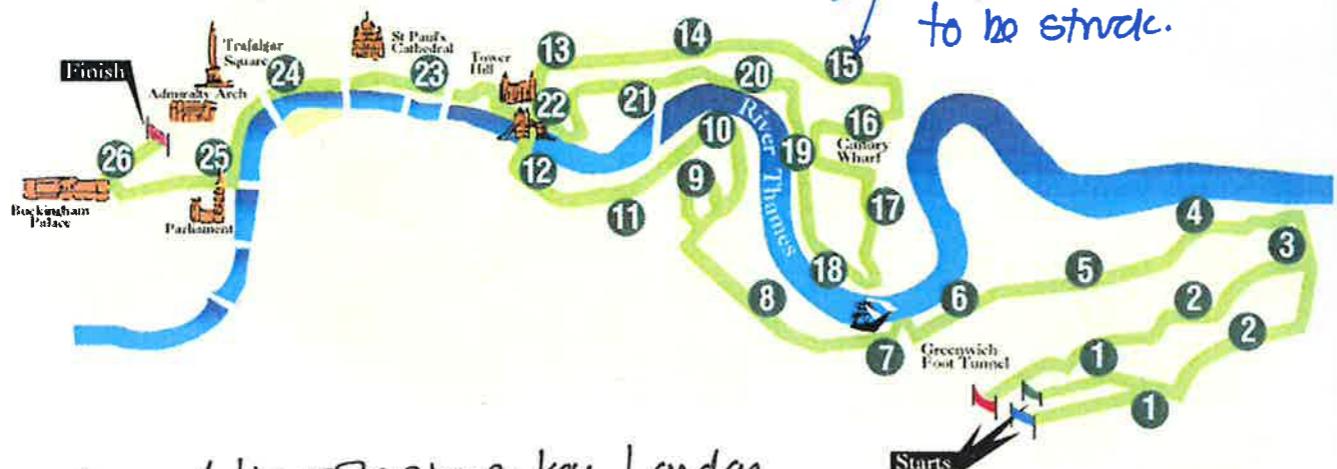


Text & numbers screenprint  
with Zebra ink.

## Design Ideas

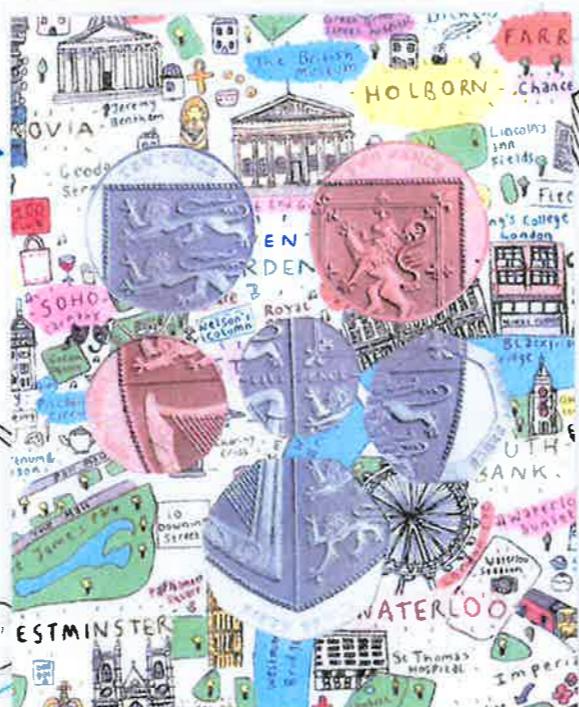


# Design Ideas



The map above of the route shows key London landmarks. Like the 2012 Olympic 'collectable' coins these landmarks could be minted onto coins or made as collectable 'coins':

Would be possible to trap corners  
in a printed map and then  
laminates them like fun prototypes



A hand-drawn map of London landmarks. The map features a large blue area representing the River Thames, which flows from the bottom right towards the center. A tall black building, labeled 'St Paul's Tower of London' at the top, stands on the right bank. On the left bank, several circular icons represent landmarks: a red double-decker bus, a white Elizabethan-style building, a green dome, and a red telephone box. Labels in red ink identify these as 'Trafalgar Square', 'Parliament', and 'Tower bridge'. In the top right corner, there is a small illustration of a city street scene with buildings, a road, and a person walking.

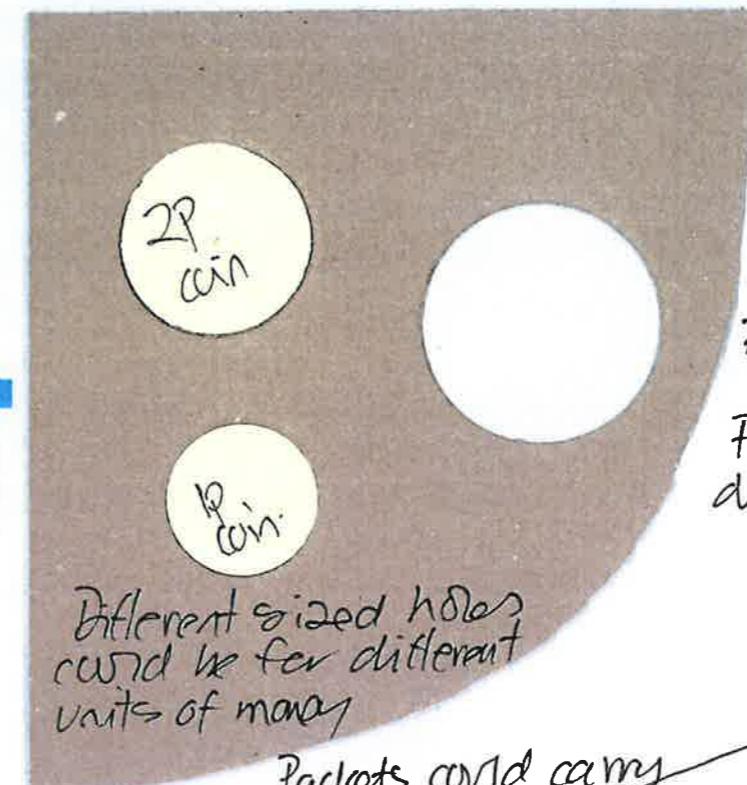
Ticket board like the example top right. Die cut to create cut outs for coins to be stored pushed into

Additional paper coating would be added to fibrefill board with lithographic printed images

Greenwich.  
Each landmark word  
has its own coin.

2 A3 folded size/in  
half with hinge down  
back.

Greenwich.  
Each landmark word  
have its own coin.



Different sized holes  
would be for different  
units of money

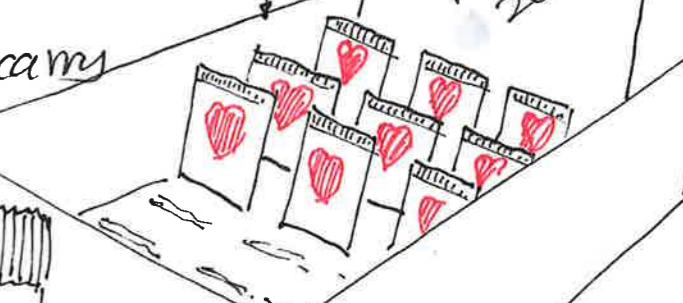
Packet covid camp  
charity loop



Bimetallic landmarks  
like ₹2 coin.

~~Folded boxboard Point of Sale (POS)  
display to share off and  
advertise~~

London  
Narration  
2018



• Fil  
compact

Vacuum  
famed  
HIPS tray.  
28.4mm  
thick.



These coins could involve word recognition - famous names for example.

Mylar foil cords  
can't break.

They would be packed at random.

Ends of packet  
are bevelled.

Packets do not allow you to see inside. [https](https://)

The Royal Mail have had collectable  
medals/coins struck for the new Star  
Wars film. They feature as part of  
Limited Edition Collectable set.

# Review of Initial Ideas

Key: Meet Fail N/A

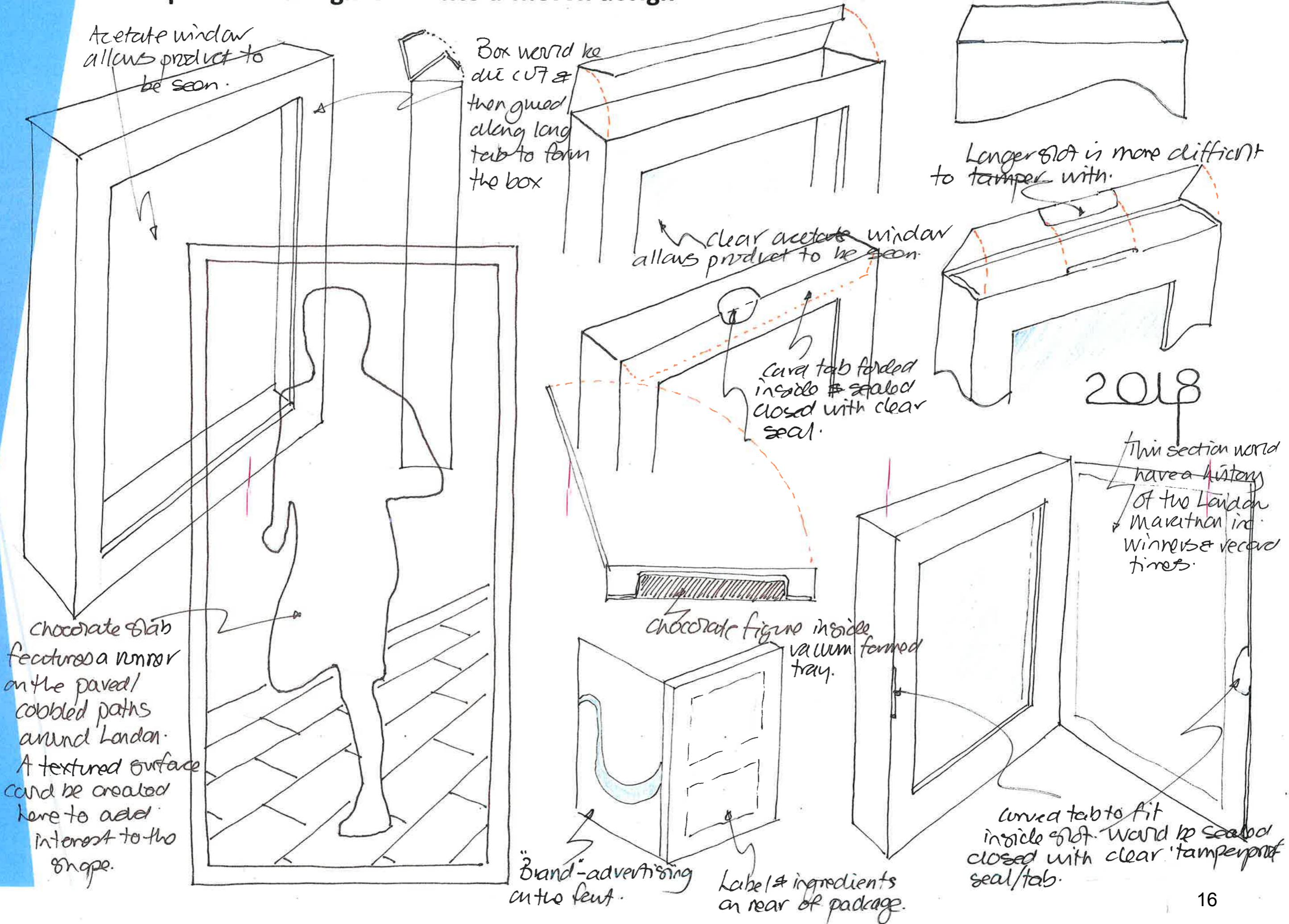
Idea	Paper block	Calendar	Chocolate bars	Collectable coins
<b>Form</b>				
The product should reflect the theme of running	The paper block concept has a ghosted image of Mo Farah on it and wrapped around map of the London Marathon route.	<b>The calendars does not have a theme other than a series of London based images.</b>	The several bars that fit together to make up a larger picture does reflect the theme of running given the image that is moulded on to it.	Here is not a specific mention of the running theme on the coins, more just the theme of London landmarks.
It should reflect the capital city and London landmarks	<b>The concept and ideas around it show the route to be taken during the event. It clearly shows the River Thames but no other landmarks.</b>	The pictures on the 12 different pages show a range of London landmarks and so it is successful in this instance.	<b>The main product does not given it is mainly focused on the theme of running.</b>	The coin holder has a London map and the coins themselves have London landmarks on them.
It should be easy to handle	The paper block is square in shape and it would be easy to tear off bits of paper once it had been written on.	The products are easy to open and sue and only require the page / numbers to be flipped over each day /month.	The bars would be easy to open by removing the paper wrappers and aluminium foil.	The product is simple to handle as the coins simply push into the cardboard holder which has appropriate sized holes for the coins.
It should be easy to stack so it can be transported internationally and locally	As a square shape it would be easy to stack and pack into any boxes for transportation. It is a shape that is easily tessellated.	They are regular shapes and as such would be easy to stack into boxes for transportation. Some of them fold flat.	The bars are regular flat rectangular shapes and therefore they are easy to stack and transport.	The whole product folds flat and is therefore easily transported.
<b>Function</b>				
The product should be capable of capturing the users imagination and interest of potential users	<b>The block is quite a standard / familiar product that can be used / branded for lots of different applications and as such it is not really that imaginative and might struggle to sell. Most people would send a message via a social media platform these days rather than leave a message on a bit of paper.</b>	<b>The calendars are basically photo boxes / boards for promoting London as the host city of the event. They are not really that imaginative in promoting the event.</b>	The chocolate bars certainly resent something different in terms of product, one being that they are edible. It is a little bit different and most people like a bit of chocolate.	It is certainly quite an interesting product and concept like the London Olympic 50p coins. They became very collectable.
It should be used to raise money for national charities and good causes	It might struggle to sell given the reasons stated above and as such it might not raise a lot of money.	It is a calendar and nothing else in terms of anything special and it obviously has a limited shelf life in that if they do not sell that they cannot be kept and sold next year.	It is difficult to see at the moment other than by direct sales how they could be used to raise money.	It is very difficult to see how this product could be used to raise money other than by sales of the holder / map to display them in.
It should be used to promote the London Marathon of 2018	The block certainly suggest that it is for London given the map and graphics. The image of Mo Farah also helps to show it is a running related product. It does not however show that it is for the London Marathon.	There is nothing specific about them in terms of promoting the London Marathon. They would be good for promoting London however due to the number of landmarks and London icons featured.	As above other than by direct sales it is difficult to see how they could be used to promote the London Marathon.	Very difficult with this product other than the coins containing some mention of the event and being minted / struck in 2018.

# Review of Initial Ideas

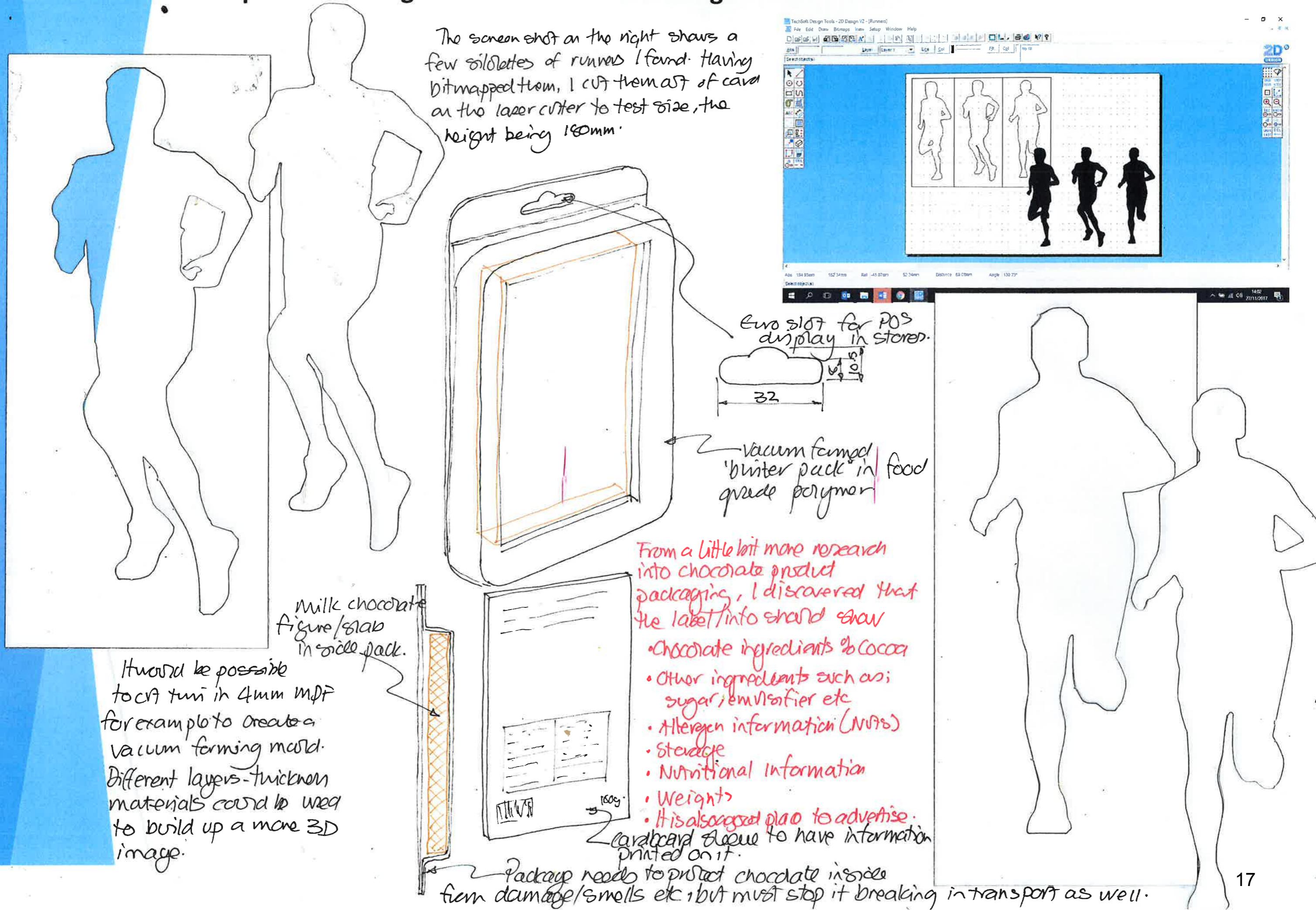
Idea	Paper block	Calendar	Chocolate bars	Collectable coins
<b>User requirements</b> It should try to involve users in helping out / raising money for charities involved with the 2018 London Marathon.	Other than being purchased as a product and any profits being used to support the charities there is no user involvement.	Just like the paper block it would only be sold as a product with profits going to the charities, it does not involve users in any way.	Other than a simple purchase or gift this product does not involve users in anyway contributing to raising money or helping out.	There is no way that users can help out or get involved with this product other than by buying or collecting the coins, some of which would be limited.
It should be easy to handle and use	It is easy to use, to write on and to tear off sheets once written on.	They would all be easy to use by simply flipping over numbers / pages as each day / month changes.	The chocolate bars would be easy to use in that they need to be unwrapped and eaten!	The coins would be sold in easy to open packages and would simply be slotted into the display holder.
It should be something that can be used and enjoyed	It is more of a functional product in terms of being used to make notes on rather than a product which is to be enjoyed.	Any of the calenders could be admired due to the photos used of the London landmarks. Calendars are useful either at home or on any office desk.	The chocolate bar would certainly be used (eaten) by most and enjoyed.	The coins could not be used as any form of legal tender and so are simply a collectable item to be admired.
It should be low maintenance	It does not require any maintenance at all.	They are certainly low maintenance other than the numbers needing to be turned over each day or pages turned over each month.	The bars would be low maintenance. They would be OK stored at shop / room temperature.	The coins would require no maintenance at all other than perhaps to occasional dust.
<b>Performance requirements</b> The product should reflect the theme of running	The block does not explicitly reflect the theme of running so much that it is obvious.	None of the calendars reflect the theme of running at all.	The bars have a runner moulded onto them giving the impression of the winner crossing the finishing line first.	The coins do not feature anything to do with running just London landmarks.
It should be easy to open, use or store	The block would be shipped and transported in a cellophane wrapper which would need to be removed before the paper could be written on. The product would be very easy to use as it is simply written on and sheets torn off.	The calendars would need some form of additional packaging for transportation such as a cellophane film which would be quite simple and easy to open. Once opened the products are easy to flip sheets or numbers over day by day.	It is quite a simple product to keep (if you can resist eating it) and the package is easy to open and remove the chocolate from.	The coins would be sold in small foil packets which are simply pulled apart to open. The coins are just pressed into the holder.
The product should be clearly marked / labelled with any relevant info / legal requirements	There would be no labelling requirements for this product other than perhaps to show what the paper is and whether it is made from recycled material.	There would be no labelling requirements here other than to say what materials the paper is in the hope that it might be recycled. Any polymers used should be clearly marked to show which specific polymer it is for recycling purposes.	Although this is just a concept at this stage, it is important to note that the chocolate would be sourced from a Fairtrade supplier and as such the logo to recognise this would be shown on any packaging.	There would be no labelling requirements here other than perhaps to label any card based materials to say it has been made from recycled materials.
Any weights and measures should be clearly shown	The only thing that would need to be shown here would be to say that it is a 500 sheet block for example.	They would be no weights or measures shown here.	No weights are shown on the label at this stage but it would be a requirement to ensure that ingredients and weights are fully detailed.	There is nothing here that needs to be labelled with weights or measures.
Any packaging should protect the product during transportation	The block would be wrapped in cellophane to protect the product during transportation and when on display in the shop.	The calendars would be wrapped in cellophane to protect the product during transportation and when on display in the shop.	There are not a lot of details at this stage about packaging but it would need to protect the chocolate bar from being damaged.	The package is quite flat as a holder and the coins would be in a POS holder which is rectangular in shape so easily stacked for transporting.

Idea	Paper block	Calendar	Chocolate bars	Collectable coins
<b>Materials and components requirements</b> The product should use as few different materials and components so as not to place a high demand on resources in terms of materials consumption and that might make it difficult or too complicated to recycle	The product is just paper which is printed on. The only other material would be a cellophane wrapper used to protect it during transportation.	Some of the calendars use a number of materials such as papers and boards, plywood, polymer wrappings and so there are quite a few materials to separate out.	There would be a paper wrapper and aluminium foil to protect the chocolate bar. There might also be some additional packaging in a polymer tray and folding boxboard outer.  Given that the chocolate would be Fairtrade it would be very unlikely that the chocolate would be sourced within the UK.	The coins would be made from metals but would not be recycled as they are the collectable item. The foil film would be difficult to recycle but the POS display could be.
It should be made from locally sourced materials and components	It is difficult to say where the paper would be sourced from but ideally it should be made in the UK and use locally sourced papers.	It is difficult to say whether this could be achieved but careful consideration should be given to the source of materials.	Although as stated above, there are a number of different materials used, they are all quite separate and would be easily sorted for recycling.	The metal for the coins could be made from recycled metals but it depends on what specific metals are being used.
It should be easy to separate different and mixed materials / components for recycling purposes	The product is just paper and once it has been written on, ideally each sheet would be recycled appropriately.		The materials are all quite separate and all capable of being recycled, either into a household recycling box or separately.	The materials are all separate and as such they would be easy to separate out and recycle.
<b>Scale of production</b> It will need to be mass produced as it will be used to help raise money for charity on a large scale	This product is easily mass produced and would probably be out-sourced to a specific company that specialises in producing this type of product.	Each of the products could be mass produced with the CD jewel case being purchased in as a standardised component from as little as 35p when purchased in volume.	The product is capable of being scaled up for mass production within any chocolate production company.	The coins would need to be pressed by a specialist company but with some of the coins being made in smaller quantities so as to make it more difficult to collect them all.
It should be easy to handle	It is a simple shape and would be easy to handle.	They are all easily handled and used by simply turning pages over.	The products are all regular shapes and easy to handle, stack and open.	The component parts are all quite small and easy to carry / move.
<b>Cost</b> It should be no higher than £10 with a proportion of that going to good causes	This product would not cost more than £10. From some research I carried out they can be produced from just under £2 depending on the volume required.	The paper based calendars would be cheaper and easier to move around when compared to the wooden framed or plywood versions.	This product would not cost more than £10. The chocolate bar in a supermarket would be no more than £2 on its own.	The map / holder would be a one-off purchase but users might have to make many purchases to collect the whole set so they could end up spending more than £10 in total.
The product should cost as little as possible so as much profit goes to the charities and good causes	As stated above, the commercial costs are quite low in comparison to potential retail costs.	They are relatively low cost products in terms of materials and high volume printing processes.	All of the component parts could be mass produced in high volume therefore reducing the overall price.	The costs are low but it depends on how many packets the user needs to buy in order to complete the whole set.
<b>Sustainability</b> The product where possible should use recycled materials and as few different materials / types of materials as possible  The product should be kept to a minimum size if at all possible to reduce the demand on resources and to reduce the volume of any	It would be quite easy and straightforward to ensure that this product used recycled materials.	It would be easy to ensure that the paper the calendars are printed on would be on recycled paper.	The cardboard packaging could be made from recycled materials but the polymer would need to be new 'virgin' material as it is food based.  The packaging is probably as small as it could be given that there needs to be some protective element to the product to stop the chocolate from being damaged.	The holder and any POS could be made from recycled materials but it depends on what metals are used for the coins.  It is a small product in terms of the holder, not being any bigger than an A4 sheet folded in half to create an A5 leaflet type product.

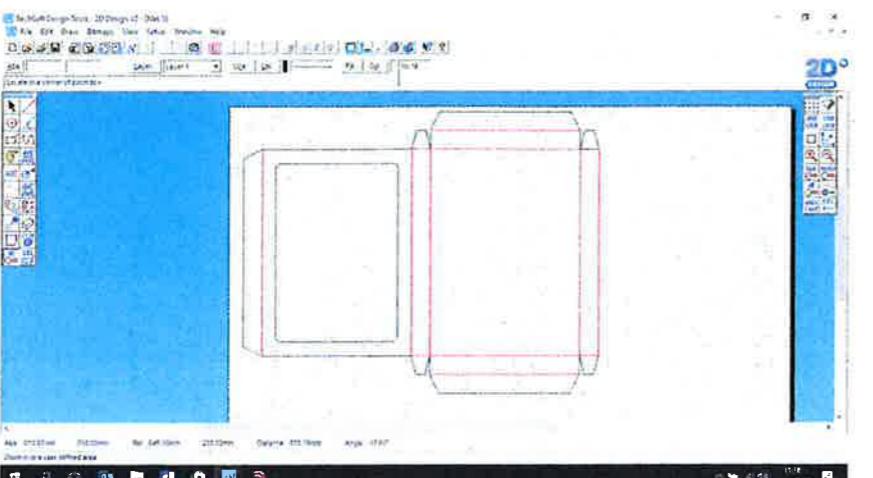
## Development of design ideas into a chosen design



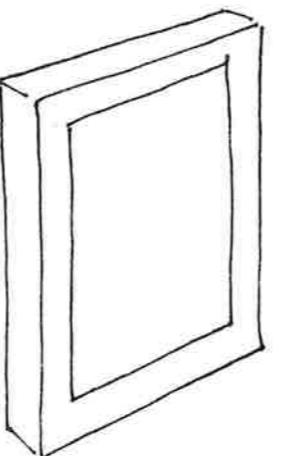
## Development of design ideas into a chosen design



## Development of design ideas into a chosen design

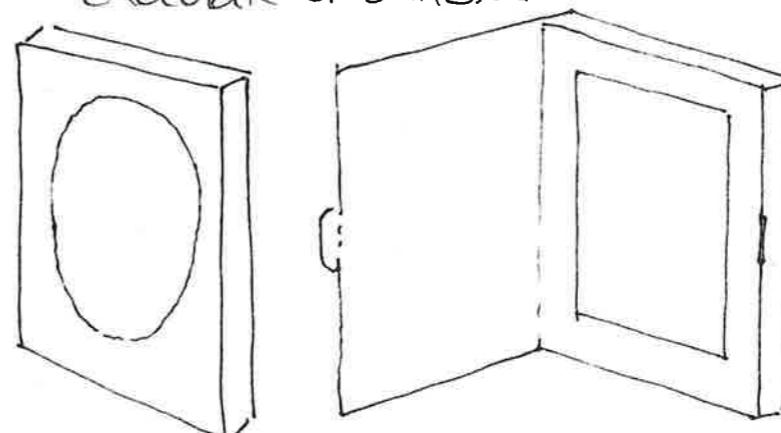


I used 2D design to create some nets of the three packages shown on the top right hand side of this page. I cut the nets on the laser cutter and then used double sided tape and clear acetate to make the prototypes. I used a craft knife and safety rule on a cutting mat to score the card nets so as to make nice clean folds. The chocolate slabs are modelled from some recycled corrugated card, different colours and then stuck to some 4mm MDF using PVA to give it some weight to simulating the weight of the chocolate bar.



$$\text{Volume of chocolate slab / rectangle} \\ 215 \times 155 \times 15 = 499,875 \text{ mm}^3 \\ \text{or } 0.0005 \text{ m}^3 (\text{rounded up}) \\ \text{or } 499 \text{ cm}^3$$

The three modelled nets/packages all have the same size chocolate slab inside.



At 546 calories per 100g twin sized bar at 662.5g represents 3614 calories.

These calculations confirm the comments made below that the chocolate slab/bar is too big.

$$\begin{aligned} \text{Slab is } 15\text{mm thick} \\ \text{Density} &= m/V \\ \text{Density of chocolate} &= 1325 \text{ kg/m}^3 (+/- 1\%) \\ \text{mass of chocolate} &= D \times V \\ 1325 \times 0.0005 &= 0.6625 \text{ kg or } 662.5\text{g} \end{aligned}$$



I showed these prototype packages to the same 4 potential users who were able to pick them up, open them and view them. Their view was that the chocolate slab showing two runners was better than just the single runner. One said "It gave more of an impression of it being a race with one runner chasing another." The other comment made was based on the different coloured cardboards used and they asked if this would be replicated in the real thing. I will take this bit forward and look at different chocolates such as white, milk and dark. The Oval window was not well received as they commented upon the fact that it obscured too much of the chocolate. The comments about the open, rectangular window were that it perhaps showed too much chocolate and so that is another point to take forward. The folded package was liked as they thought it was a bit like a gift card and that it would be a nice surprise when you opened it.

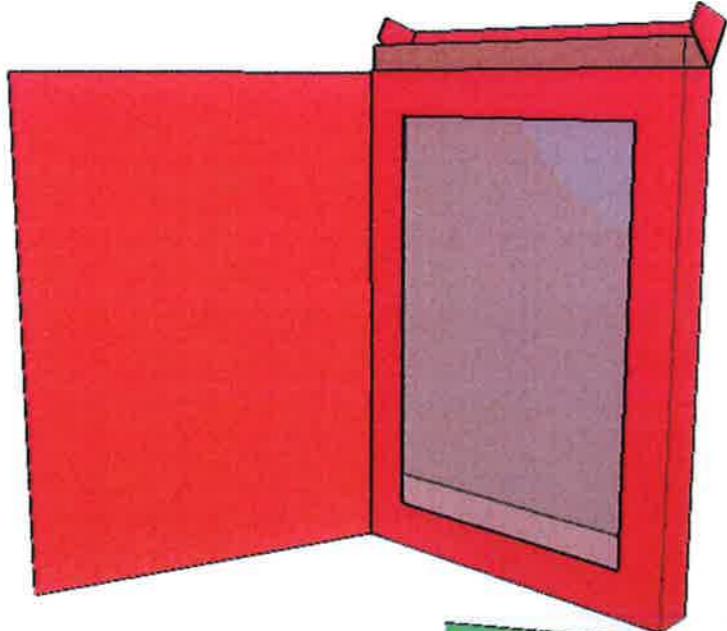
The one overwhelming comment was that other than it potentially being a gift, there was no real incentive to buy it in support of the London Marathon and all the charities and good causes that benefit from the money raised. They also thought that there was quite a lot of chocolate potentially and suggested that I should try and make the slab a bit smaller.

### In summary:

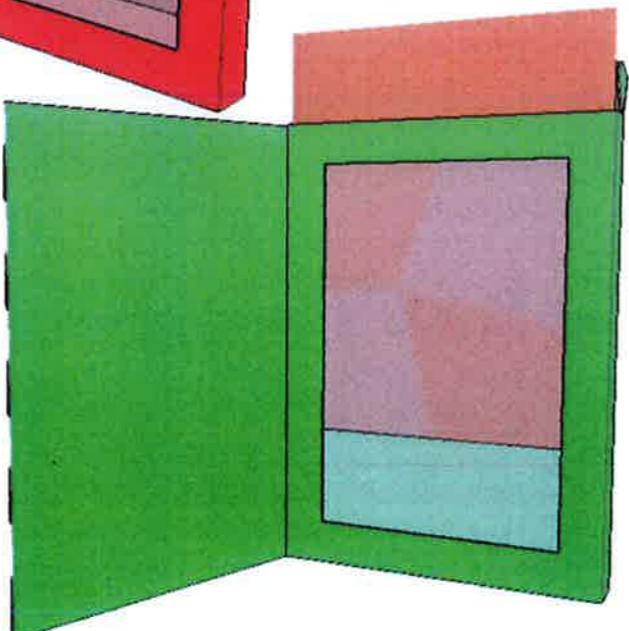
1. Investigate the different types of chocolate that can be used in order to try and achieve some colour variation
2. Consider making the window opening a bit smaller as the card type prototype gets further developed
3. Reduce the size of the chocolate bar (see calculations above)
4. Incorporate the feedback about colours
5. Come up with a method to incentivise people to buy it.

# Development of design ideas into a chosen design

## Complementary Color Wheel



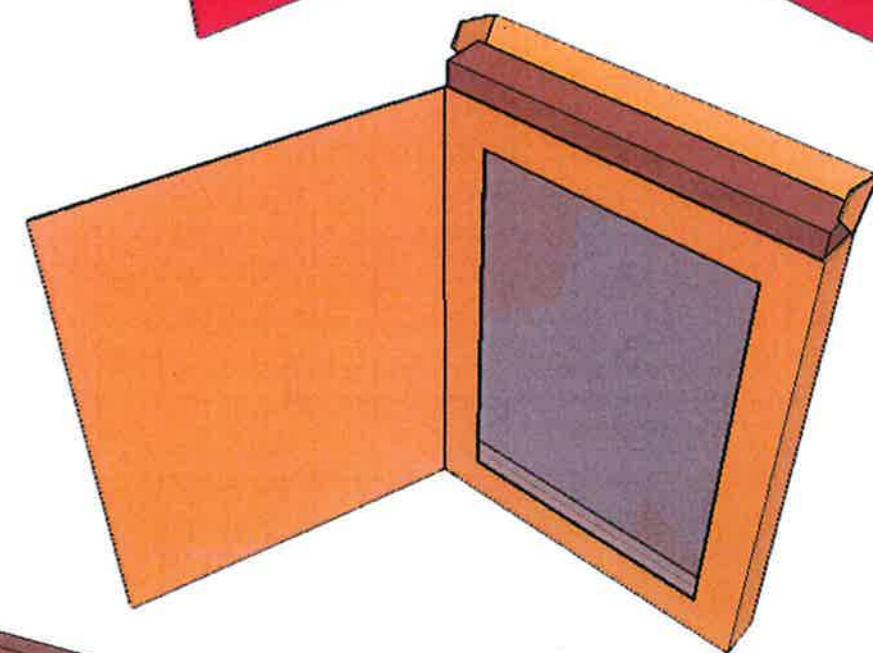
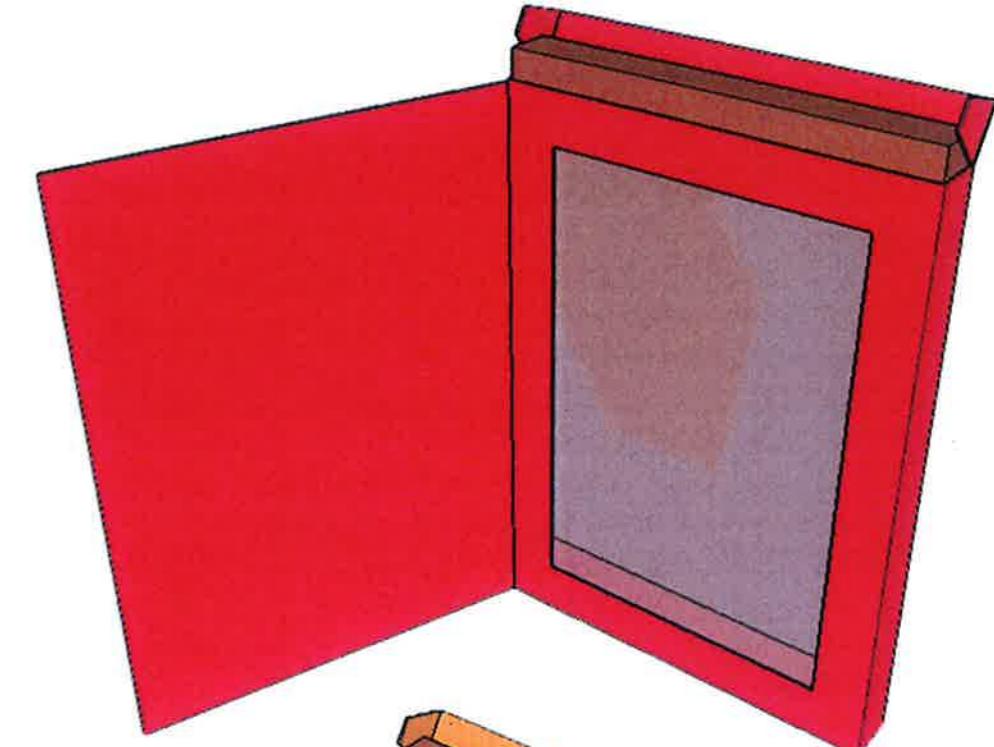
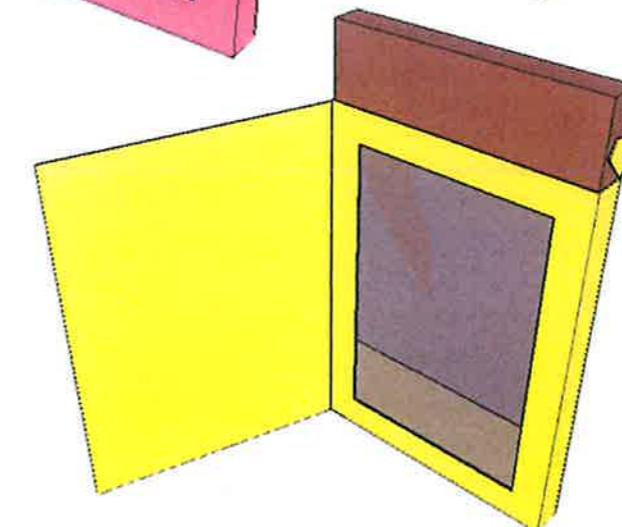
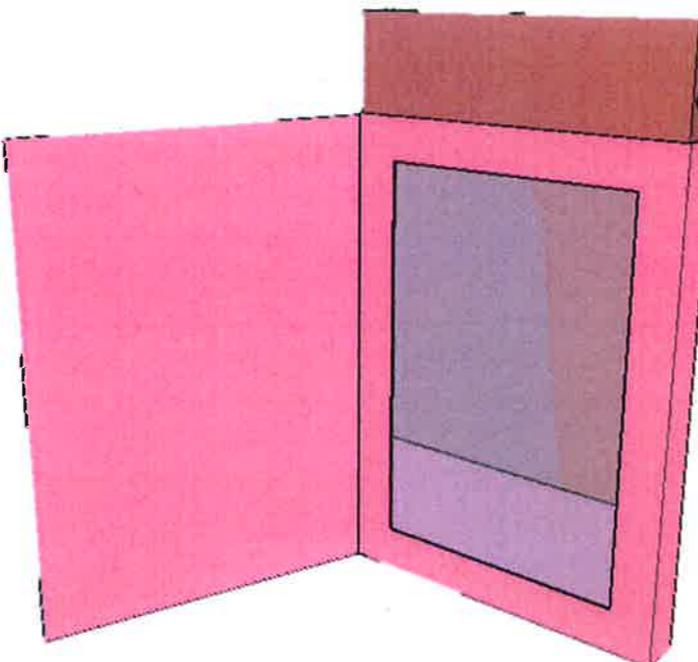
Although green is a complementary colour to the brown base, it was not liked by any of the 4 potential users. However, one asked if a blue version would be available.



I showed these colour alternatives to four potential 18 year old users as a group. Their thoughts are recorded below.

Although I have only modelled the one package design here I have coloured in several different ways based on the colour wheel shown left.

Given the chocolate will mostly be milk chocolate, I have based the colour variations on a brown colour. This means the complementary and contrasting colours will match the brown base colour.



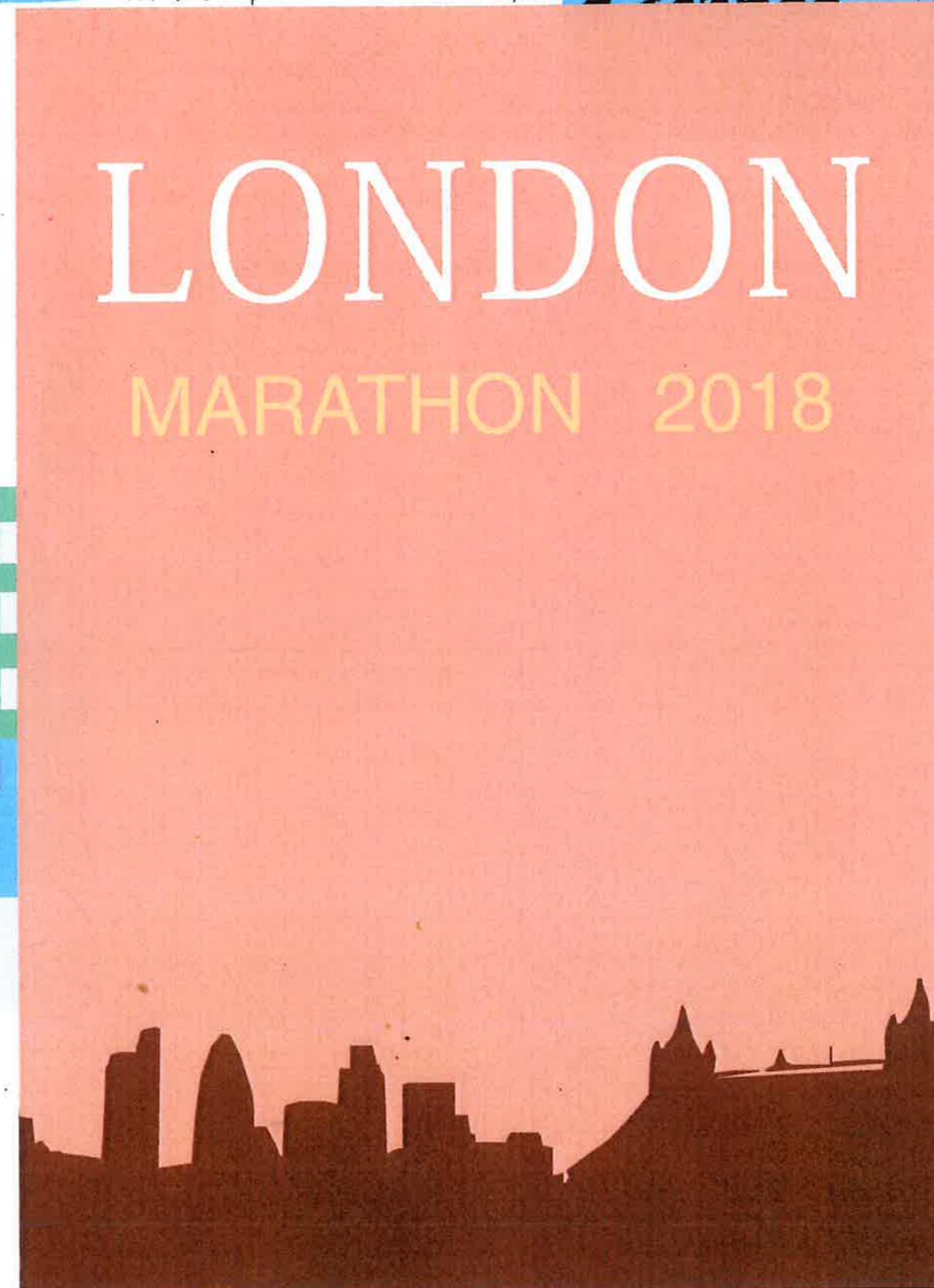
In summary, I have decided to take the yellow base colour forward but to tone it down quite a bit so it is a creamy colour.

The red box at the top was favoured by most however they all thought that it was a bit too bright and 'hot'. All 4 commented upon the use of red in food packaging, McDonald's, KFC and Costa to a certain extent. Both the yellow and orange were also liked but again the comment was made about the colours being too intense and they favoured a more pastel pallet base. One suggested that if the yellow were toned down a bit and it was more a pastel, creamy colour, it would look a bit like the Thornton's Chocolate brand colour of their chocolate boxes.

## Development of design ideas into a chosen design



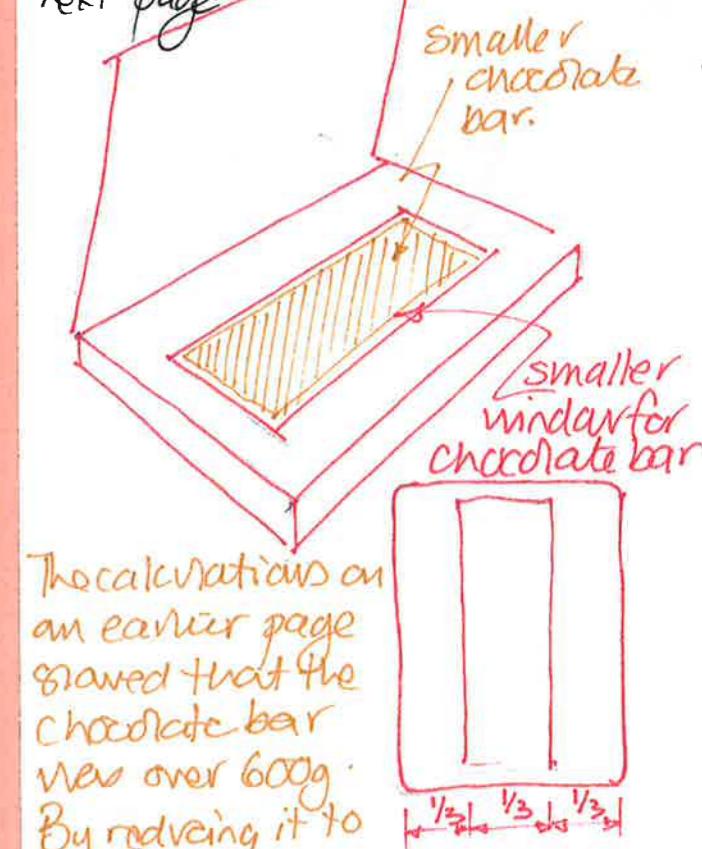
Having followed up on the feedback from the earlier testing, I have tried to soften the colours a little. The image above is very pastel based but the one on the right reflects the chocolate colours more.



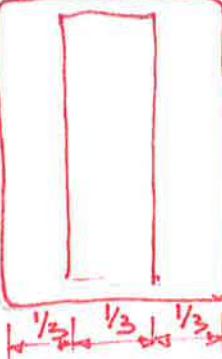
I used 2D Design to create some front cover designs for the chocolate box. By bitmapping & contouring I created two London skyline and runners. I also cut 'London' out using a 'stencil' font and then put it over a London picture.



This 'stencil' cut word and the London photo are on the next page.



The calculations on an earlier page showed that the chocolate bar was over 600g. By reducing it to  $\frac{1}{3}$  of the width, it would come down to approx 200g. By also reducing the height a bit would also help.

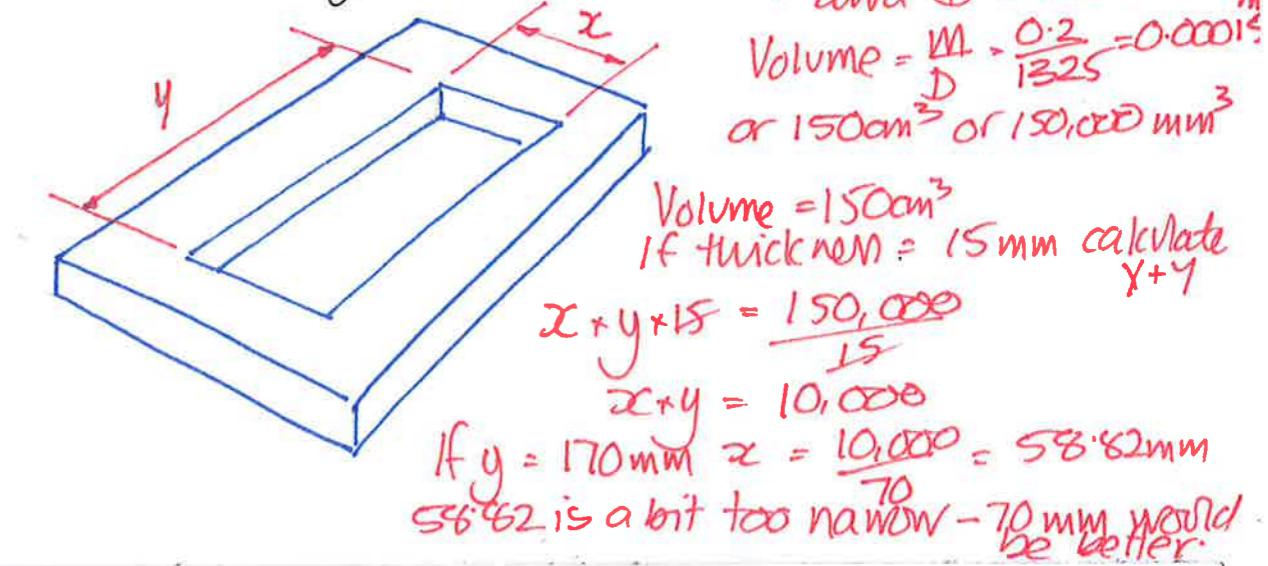


I will create a new net to take into account the smaller window and to try and reduce/remove the acetate window.

## Development of design ideas into a chosen design

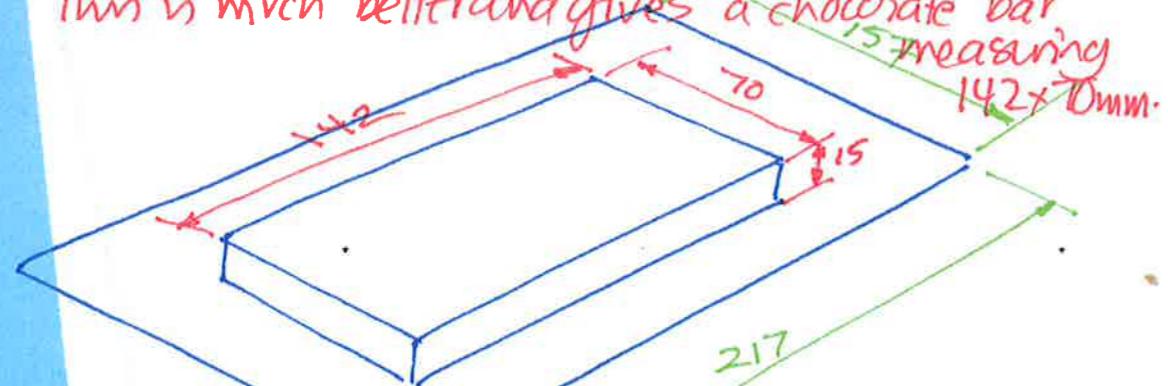


Although the white card does not really help here, the four potential users I showed these examples to preferred the larger text but the more yellow/orange based colour. They did however all favour the image from the previous page in the chocolate bars with the dark brown London skyline.



Therefore if  $x \times y = 10,000$  &  $y = 70$   $x = \frac{10,000}{70} = 142.85\text{mm}$

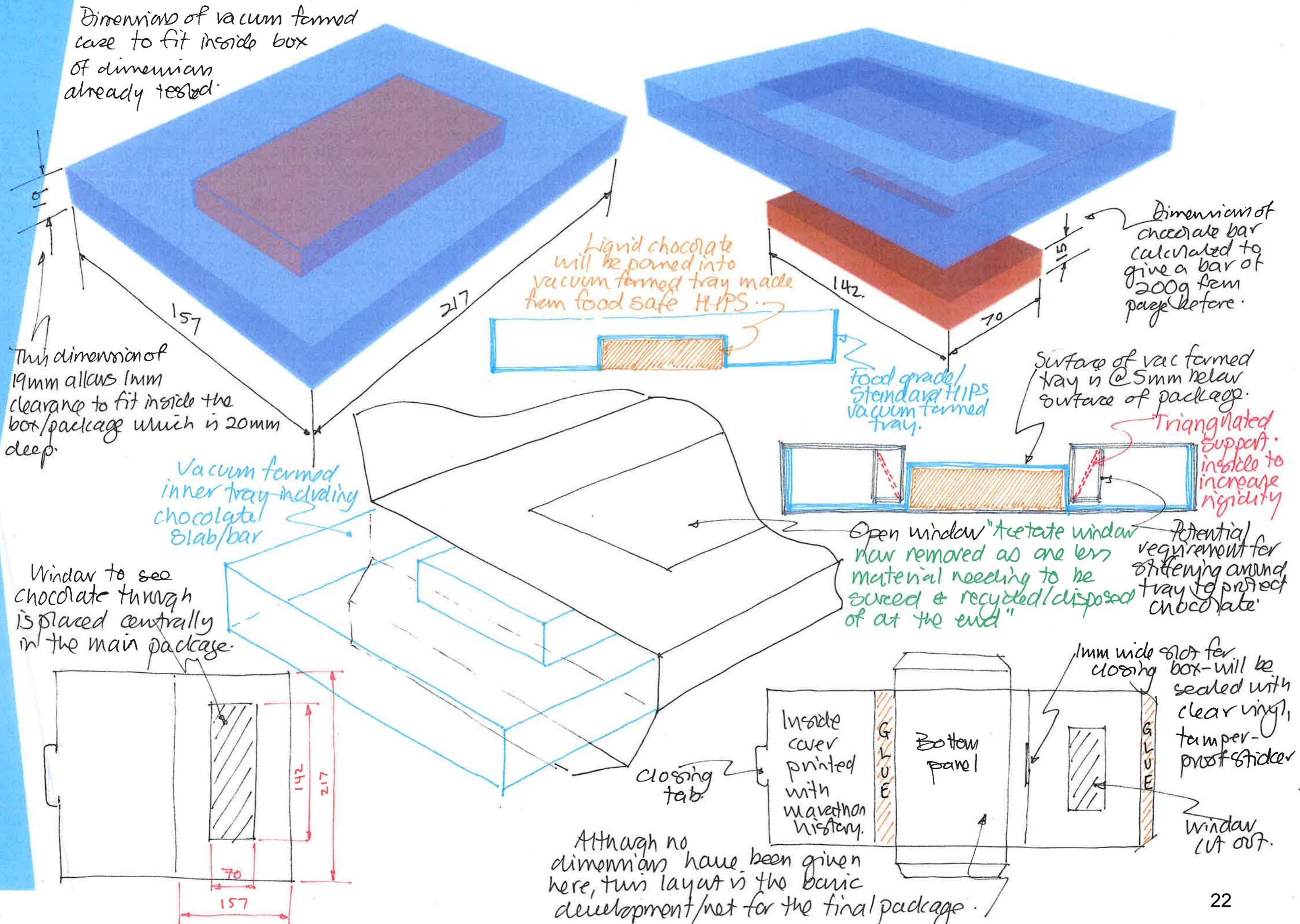
This is much better and gives a chocolate bar measuring



I will make the window of the box 150x80 but it will be vacuum formed as an insert and therefore will sit snuggly inside the packcap to stop the bar from moving around inside.

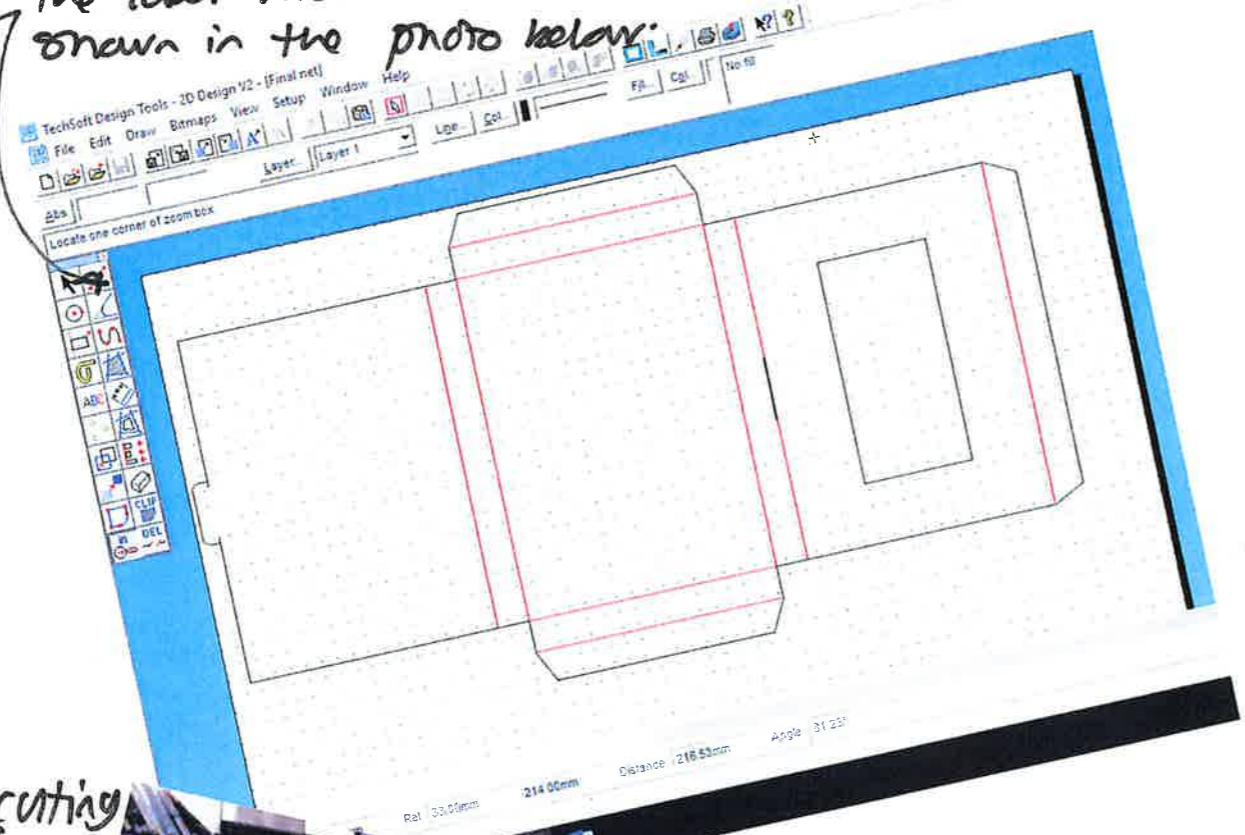


## Development of design ideas into a chosen design

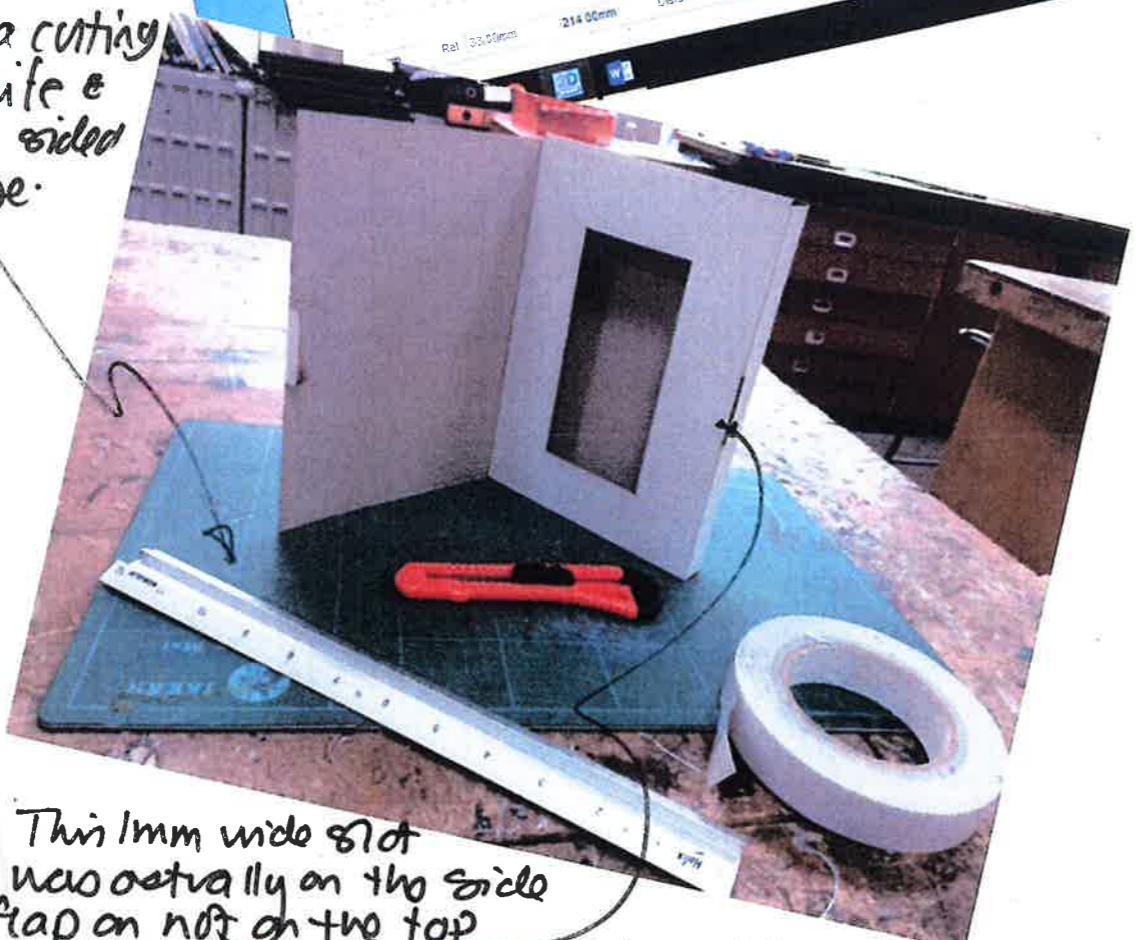


## Development of design ideas into a chosen design

This screen shot is of the developed package with the smaller window. The red lines highlight the fold/score lines. Once it had been cut on the laser I assembled the net which is shown in the photo below:

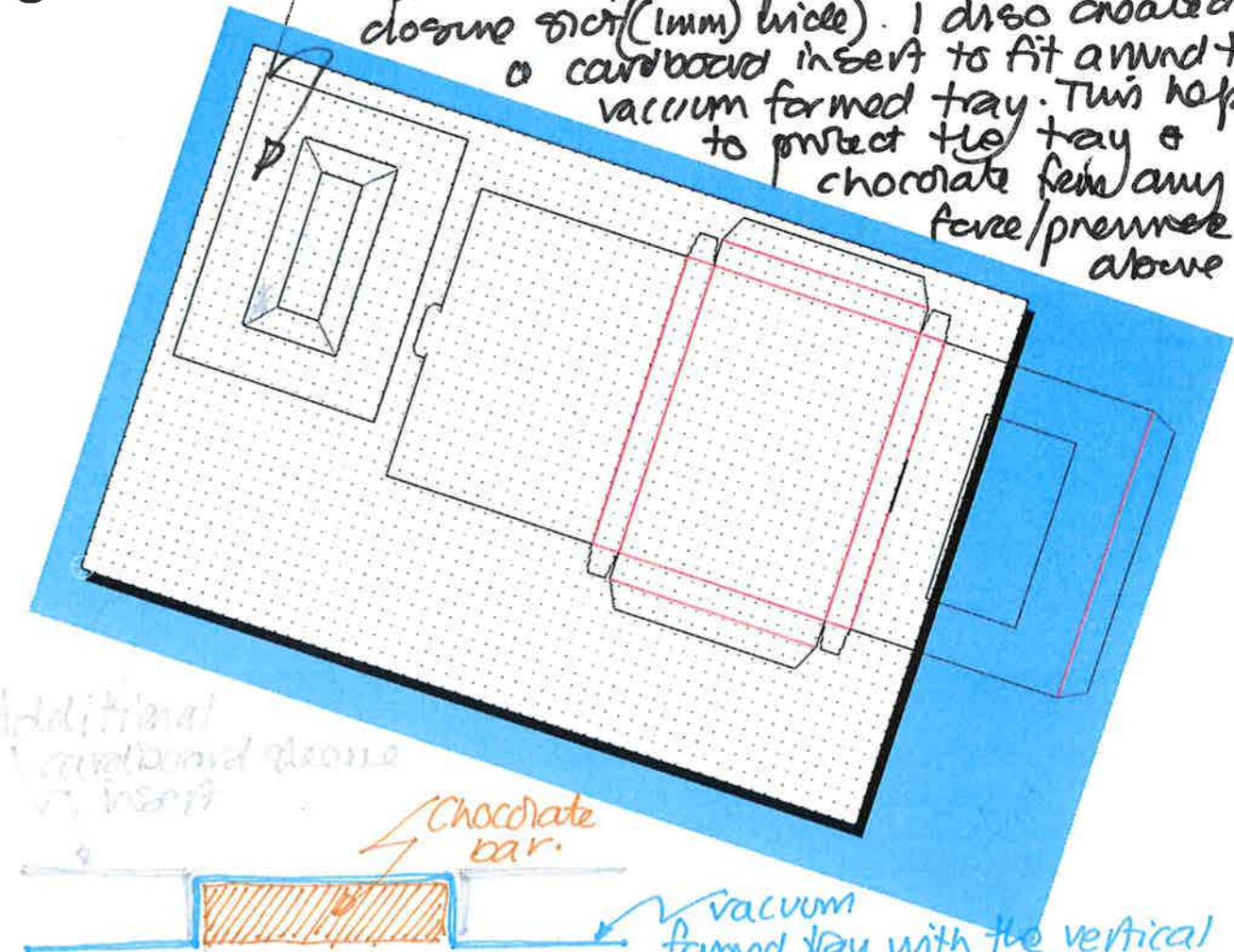


I used a cutting mat, knife & double sided tape.



This 1mm wide slot was actually on the side flap on not on the top surface which meant the top lid would not line up & close the box.

This new screen shot shows a few improvements/developments. I moved the closure slot(1mm wide). I also created a cardboard insert to fit around the vacuum formed tray. This helps to protect the tray & chocolate from any force/pressure from above.



Additional  
cardboard sleeve  
in insert

Chocolate  
bar.

vacuum  
famed tray with the vertical  
side removed.

This photo shows the additional  
cardboard inner sleeve in place  
for additional protection. It will  
need to be placed around the  
chocolate bar in the tray and then  
glued/inserted into the main package.



slot in the correct  
place 'top' to hold  
the lid in place.

## Development of design ideas into a chosen design



In thinking about a way to increase sales and to create an incentive for consumers to purchase this 'merchandise', I remembered the film 'Willy Wonka's Chocolate Factory'. He created the Wonka bar and gave away five golden tickets. Each ticket holder was invited inside the factory. I have decided to include 5 Golden tickets as a feature to hide inside the package. Each of the five lucky winners will be involved in the marathon by either presenting medals to the winners or by starting the elite runners race.

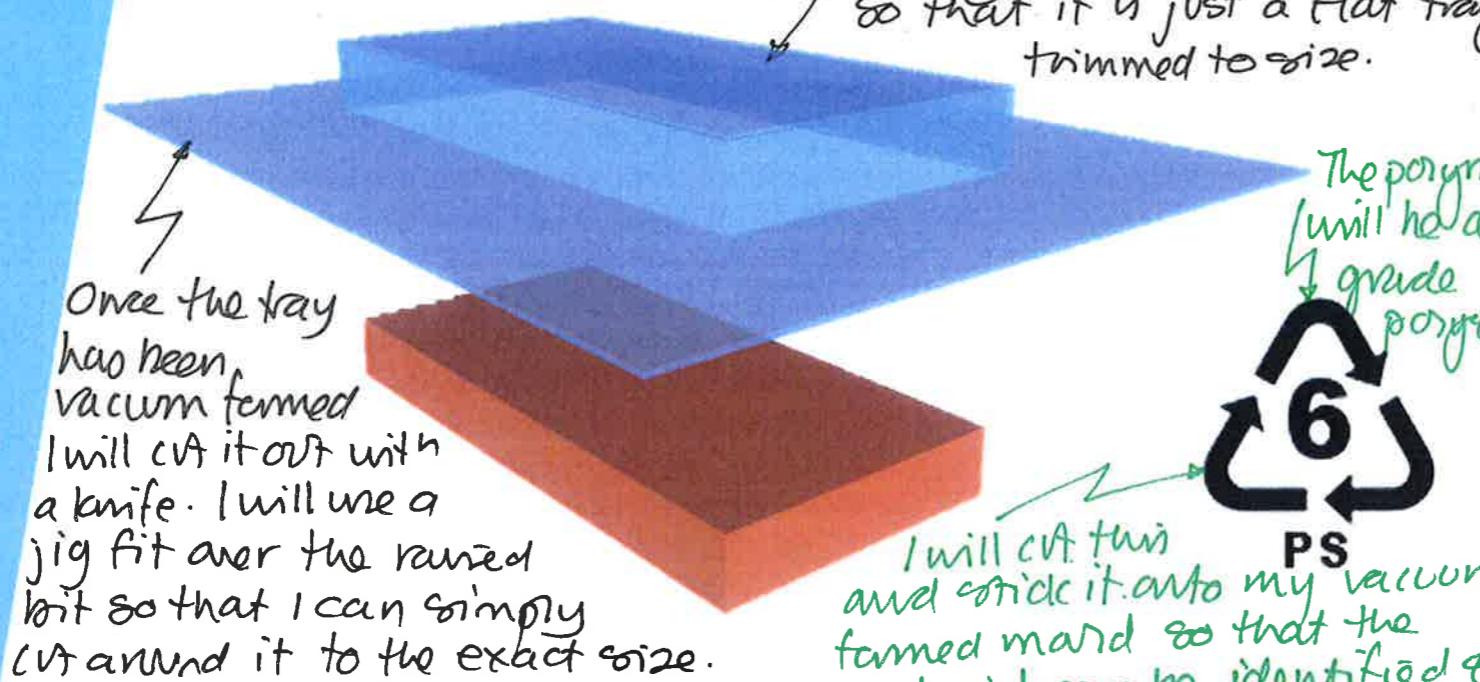
1. Start the race
2. Present medal to winning male
3. Present medal to winning female
4. Present medal to winning male parathlete
5. Present medal to winning female parathlete

I used a foil balloon to make a mock up of the ticket and the package it would go in inside the chocolate bar.



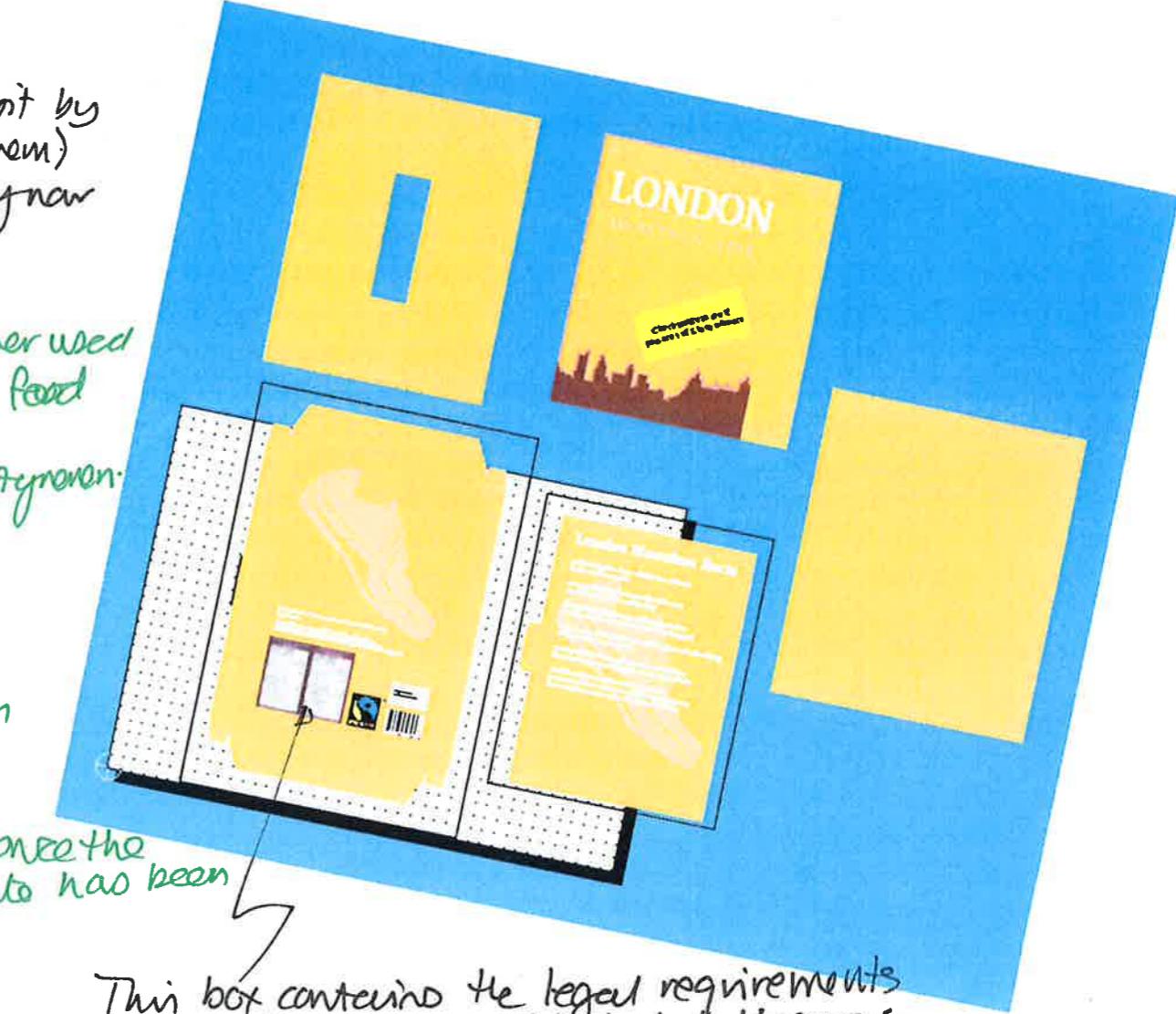
This material is a  
foil 'mylar' and will not react  
with the chocolate inside.

## Development of design ideas into a chosen design



The polymer used will be a food grade polystyrene.

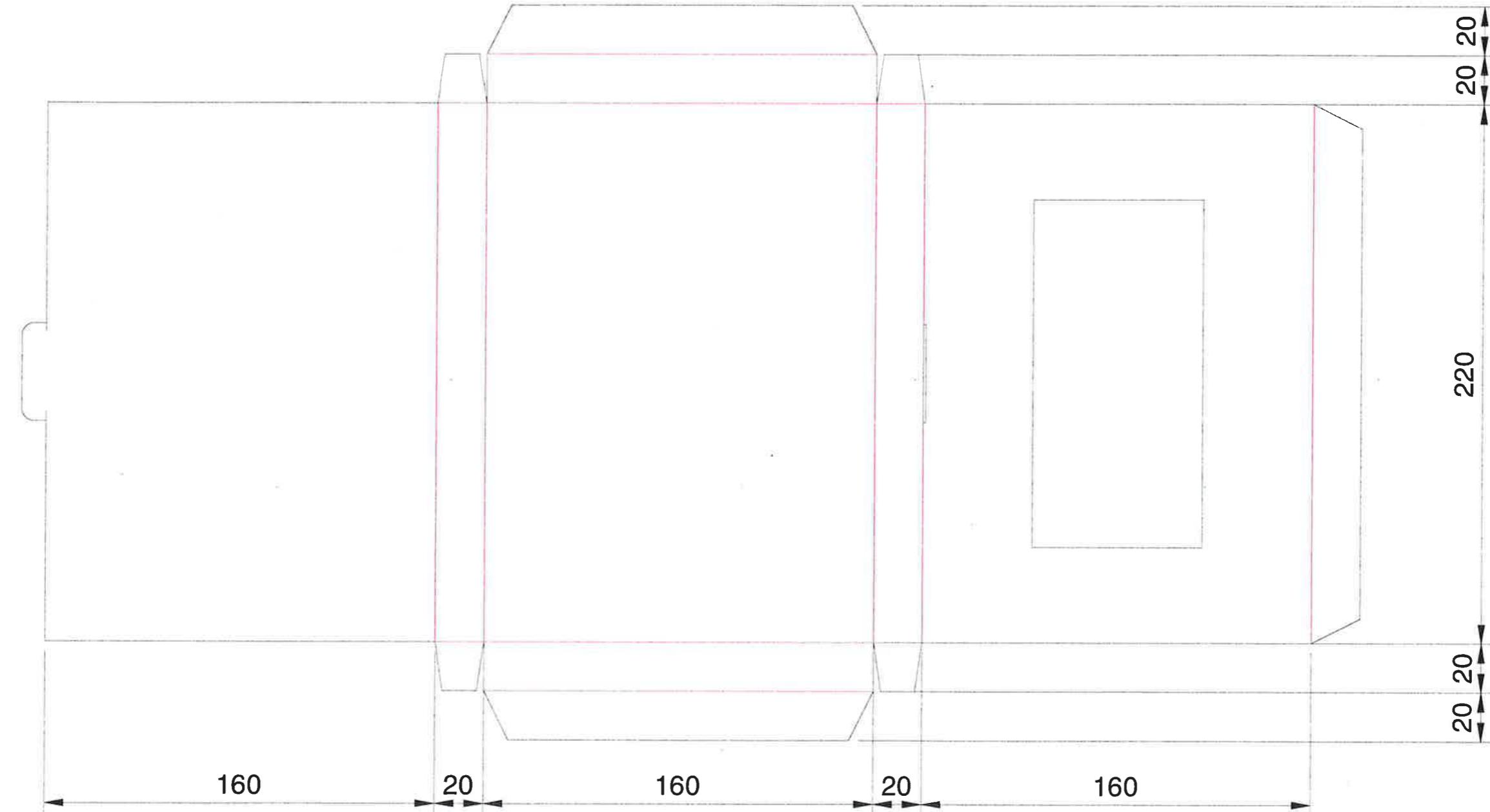
I will cut this and stick it onto my vacuum formed tray so that the material can be identified & recycled once the chocolate has been eaten.



The inside sleeve contains facts about the London Marathon such as who has won it most times/ which country is most successful, number of water bottles given out etc.

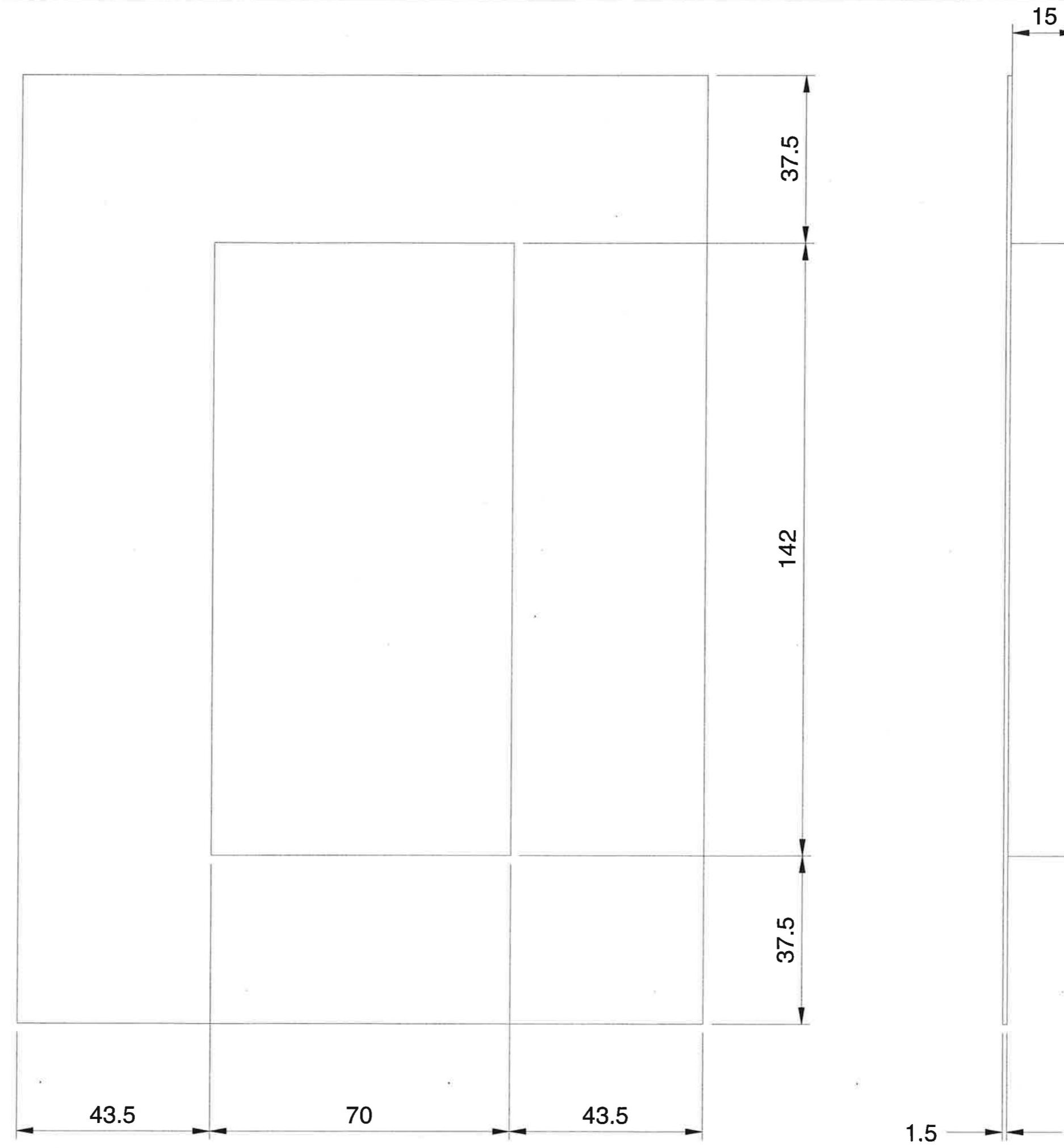
The front cover now contains a slogan/advertising to say check inside to see if you have won. This would be hot-foiled blocked to look like a 'Golden ticket'. Although it would add an extra price to the packaging - it highlights the product/campaign.

Hanging printed this page, I now realize that I have missed the recycling logo from the rear of the package. I have updated the file to include it now.



Scale 1:2

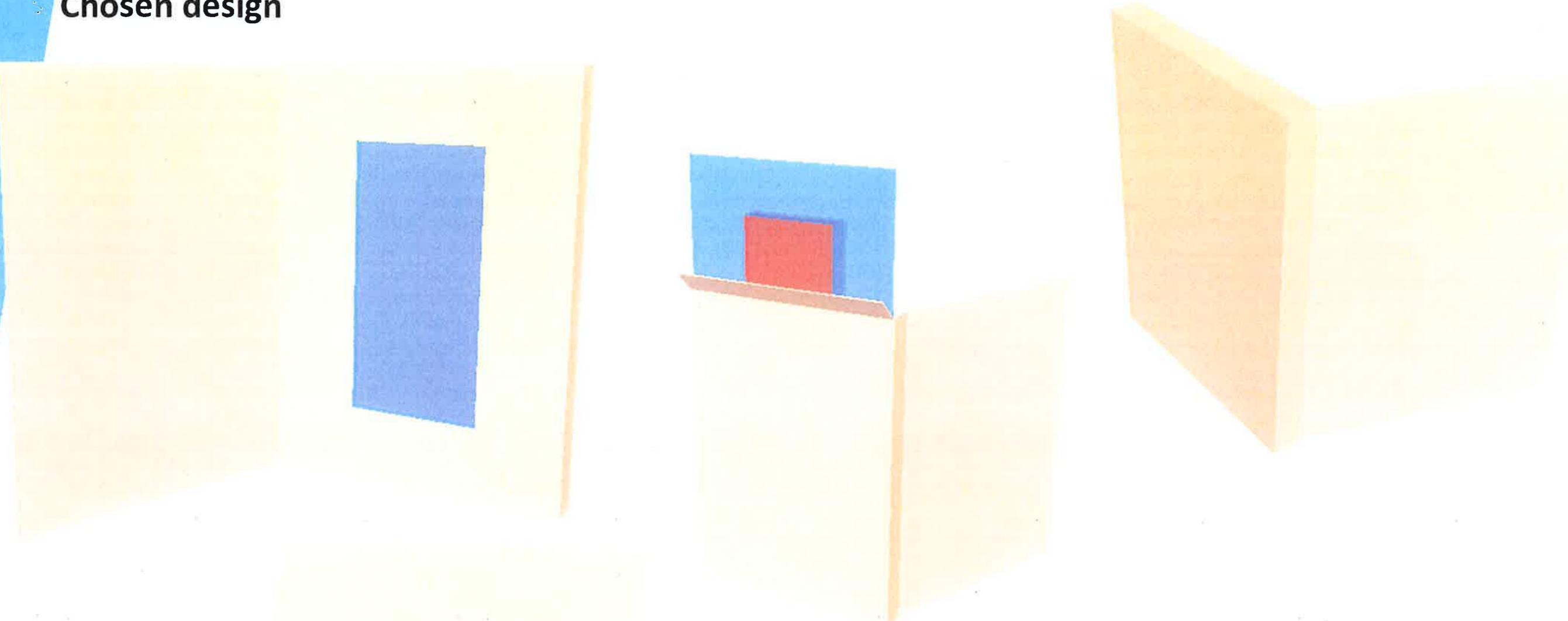
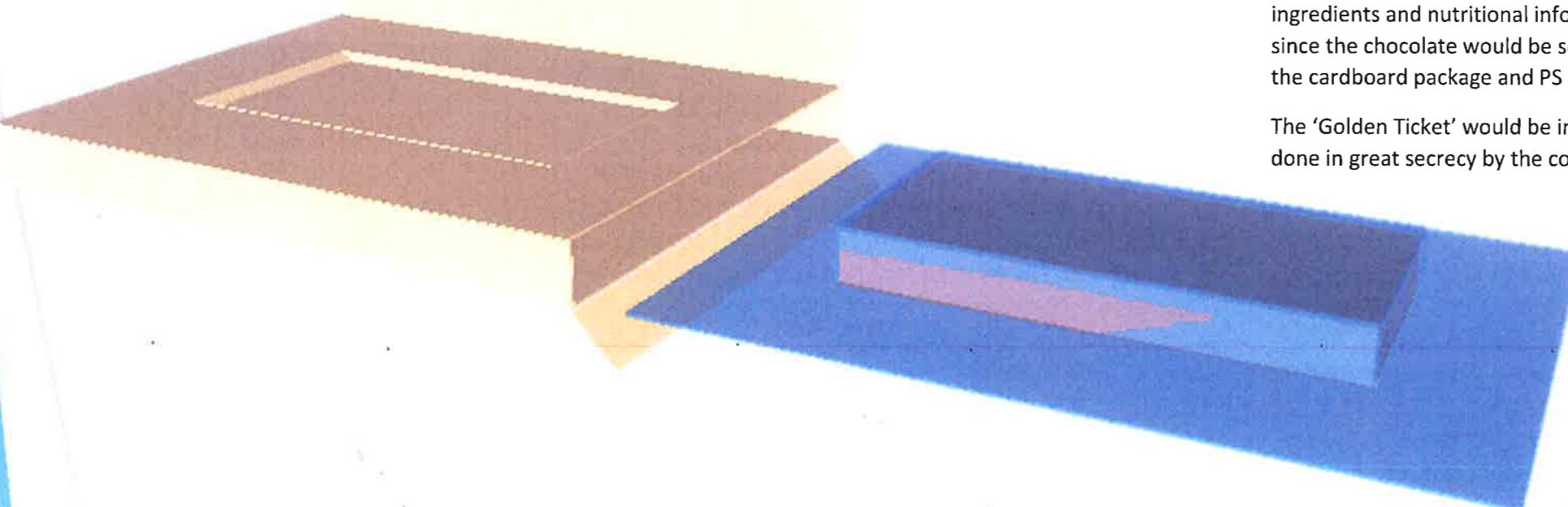
Final Package Dimensions



Final Mould Dimensions

Scale 1:1

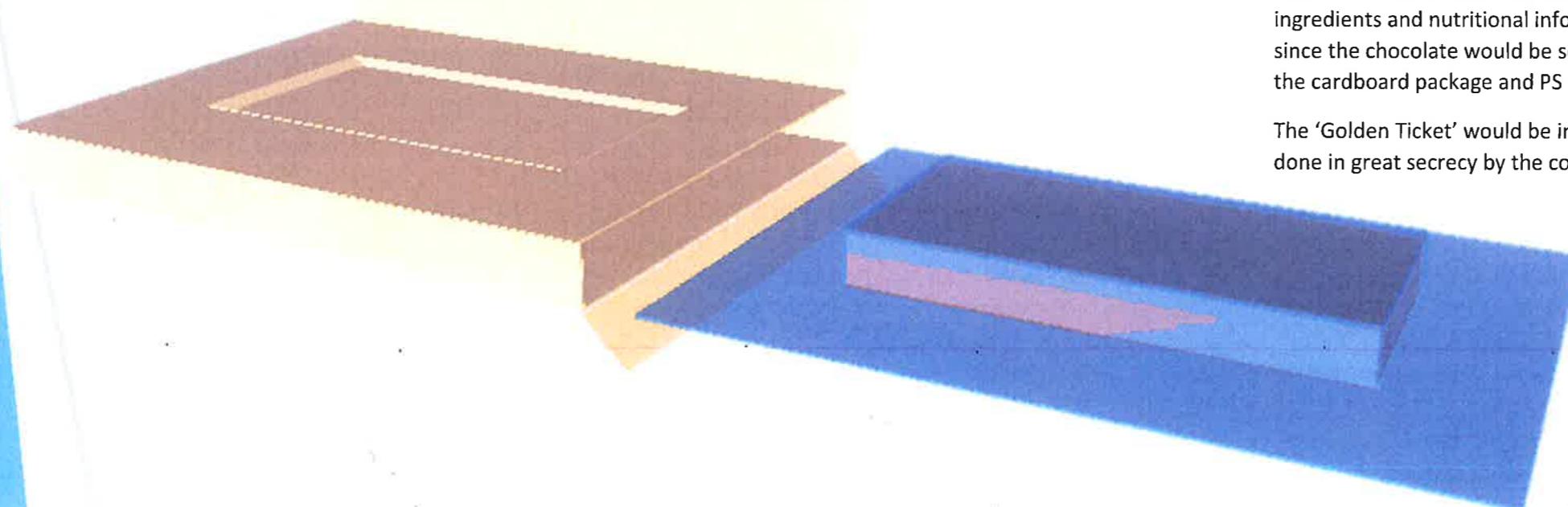
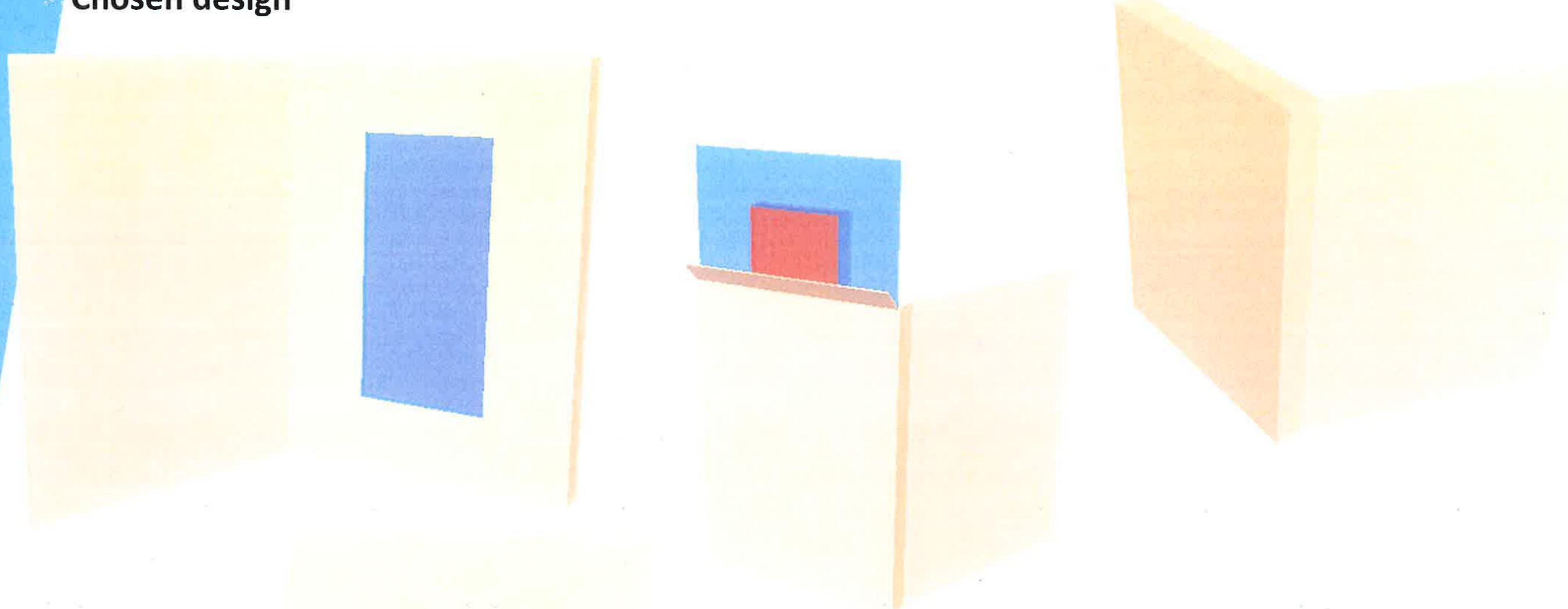
## Chosen design



The images shown on this page are of the final design proposal for the chocolate box and inner vacuum formed mould. The colours of the box are from the previous pages however these rendered images do not show the surface graphics which are featured on the previous page in greater detail. They show all of the legal requirements in terms of weights, ingredients and nutritional information. They also include a bar code, the fair trade logo since the chocolate would be sourced from a fair trade supplier, and a recyclable logo since the cardboard package and PS mould can all be separated out and recycled.

The 'Golden Ticket' would be inserted into the complete package but it would have to be done in great secrecy by the company so as not to give away the locations of the packages

## Chosen design



The images shown on this page are of the final design proposal for the chocolate box and inner vacuum formed mould. The colours of the box are from the previous pages however these rendered images do not show the surface graphics which are featured on the previous page in greater detail. They show all of the legal requirements in terms of weights, ingredients and nutritional information. They also include a bar code, the fair trade logo since the chocolate would be sourced from a fair trade supplier, and a recyclable logo since the cardboard package and PS mould can all be separated out and recycled.

The 'Golden Ticket' would be inserted into the complete package but it would have to be done in great secrecy by the company so as not to give away the locations of the packages

## Review of chosen design

Part	Material	Method of manufacture and material properties
Outer sleeve	Folding boxboard	Folding boxboard is an excellent material for scoring, bending and creasing without any splitting which would potentially visually ruin the appearance of the product. It has an excellent surface for printing on, all of which makes it an ideal material for food packaging and general cartoon applications. The outer sleeve would be printed using the offset lithographic process due to the potential high volume required. This process is capable of printing on both sides of the material at the same time at very high speeds using the four plate process (CYMK). This process can use continuous rolls of paper or 'webs'. Once printed and dry, the cartoons would be die cut and creased at the same time before moving into a folding machine. The box would be joined together with an adhesive being applied before being folded over and pressure applied. The box would be finished with a hot-foil blocked image of the 'Golden Ticket' showing inside. This would improve the overall appearance of the package and would draw potential users / buyers to the product.
Inner sleeve	Folding boxboard	As above but it is a single piece which is printed, die cut and folded into shape.
Chocolate mould	Rigid polystyrene	A former is required which would be made from an epoxy resin due to its hardness and ability to withstand high temperatures. The chocolate mould would be vacuum formed, several at a time before being cut and trimmed on a guillotine. The polymer used for the mould would be a food grade rigid polystyrene making it safe to use with the chocolate.
Golden ticket	Foil-lined board	Only five of these tickets would be required and they would therefore be digitally printed as a very small batch. They would be printed on a gold foil-lined board with a black ink.
Golden ticket sleeve	Mylar film	Mylar is an inert material and is therefore safe to use up against the chocolate bar. Again only five wrappers would be required and so this would mean a very small batch being required. They would be made in a gold fil to go along with theme of the golden ticket.
Closure tab	Polyvinyl Chloride (PVC)	The package would be sealed closed with a PVC stamped circular disc folded across the top of the box to seal the lid closed and across the front flap of the package.
Chocolate bar	35% Cocoa Solid chocolate	The chocolate would be sourced from a fair trade supplier and would be melted and piped into the chocolate mould in a specialist factory where the whole product would be assembled, including the five 'Golden Tickets' being inserted. At this point the packages would be packed into corrugated cardboard boxes, taped sealed and dispatched to a warehouse or distribution centre.

## Feedback

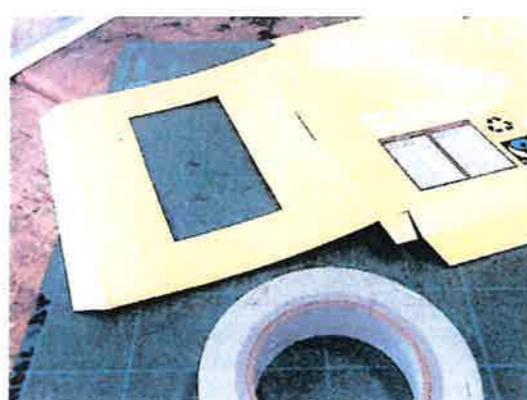
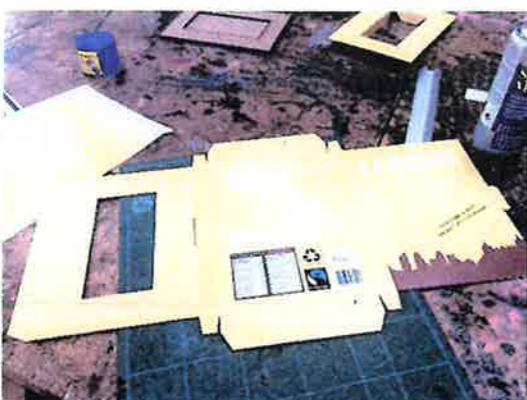
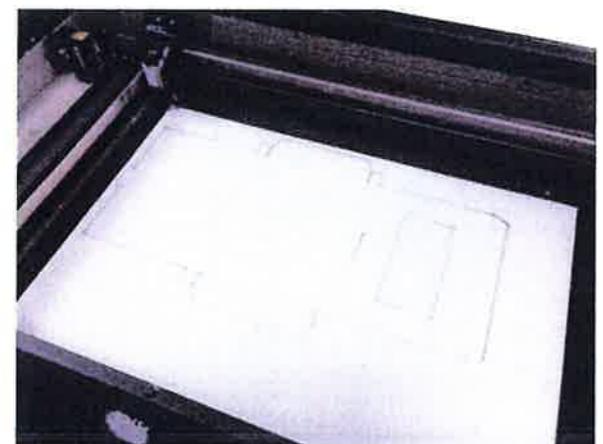
The points below in red were made in response to the early prototypes developed and tested. I have tried to address each of the points through further development and have attempted to summarise my conclusions below in response to each of the specific points, shown in blue text, as to how I arrived at my chosen design solution.

1. Consider making the window opening a bit smaller as the card type prototype gets further developed – the window is now significantly smaller and only shows the opening to be able to see the chocolate bar itself. The acetate window has also been removed which means a reduction in the number of materials required, a reduction in the manufacturing processes required and it reduces the need for additional materials separation when recycling.
2. Reduce the size of the chocolate bar – the chocolate bar has been reduced by approx. 2/3rds. The initial calculation showed the bar to be in excess of 600g and the bar is now down to 200g. This naturally means a reduction in the cost of the product and it also makes it a much more responsible product in terms of reducing the amount of chocolate to be eaten and the calorific content. The reduction in the size of the chocolate bar also makes a significant reduction in the overall weight of the product being transported from the factory to any warehouse and retail outlets.
3. Incorporate the feedback about colours – the overall package is now a lot lighter reflecting the feedback. The main colour is more like a creamy yellow colour with the additional surface graphics a darker brown which compliments the overall colour but is also more like a milk chocolate colour.
4. Come up with a method to incentivise people to buy it – the product now includes five 'Golden Tickets' which provides an incentive for users. The intention here is that it will create a buzz and hype for users to buy the product with a view to winning one of the five 'Golden Tickets'. This will hopefully increase potential sales, promoting the event and raising money for charities and good causes in the process. This means that anyone who buys one is in with a chance to win but everyone will help make a contribution in terms of raising money. The lucky ticket winners will be involved by either starting the elite race or presenting the respective winners with their medals.

In summary I believe that I have addressed all of the points raised from the feedback and that this chosen design solution fulfils most of the requirements of the initial product specification, which I will fully test the prototype against once it has been manufactured.

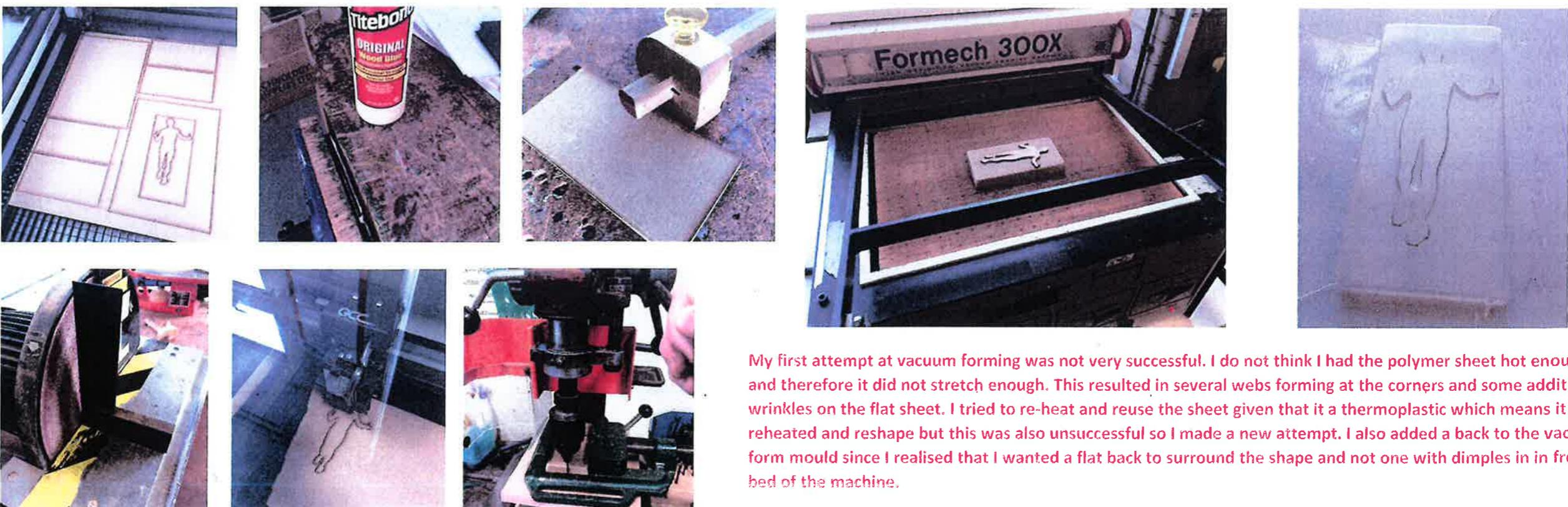
# Manufacture

Step	Process	Tools and machinery	Safe working practice
1	Draw net package on 2D design and cut out on the laser.	Computer and associated software	Ensure settings are correct for cutting and marking card where it is to be scored for folding. Make sure the settings are not too high so as to burn the card and cause a fire. Ensure that the extraction system is on when the laser cuts to remove any smoke or fumes created.
2	Design graphics on 2D design using features such as colour fill and importing images from the internet to bitmap and contour.	2D design and A3 colour printer	
3	Score and fold the laser cut net. Light score lines where the net is to be folded.	Craft knife, cutting mat and safety rule	Ensure a safety rule is used in case the knife slips. A cutting mat is also to be used to ensure the work does not move or slip and to protect the worktop surface.
4	Cut out the colour graphic surfaces that are to be glued to the laser cut net. The graphic sheets should just be cut finished to one edge so that they can be stuck to the cardboard net and then cut or trimmed to the exact size required. This means that only one edge has to be lined up accurately when sticking the two together. The surface graphics can be applied to all of the flat surfaces of the laser cut net, on both sides where necessary.	Craft knife, cutting mat, safety rule and spray glue	The safety rule, cutting mat and craft knife should all be used together carefully. The spray glue should be used sparingly and applied in a small extract unit to make sure that no unwanted or stray fumes get into the air and are breathed in.
5	The net can now be assembled from a flat shape into a 3D package by applying double sided tape to the surface (tab) to be joined to make the joint.	Craft knife, cutting mat and double sided tape	The double sided tape should be trimmed flat on a cutting mat



# Manufacture

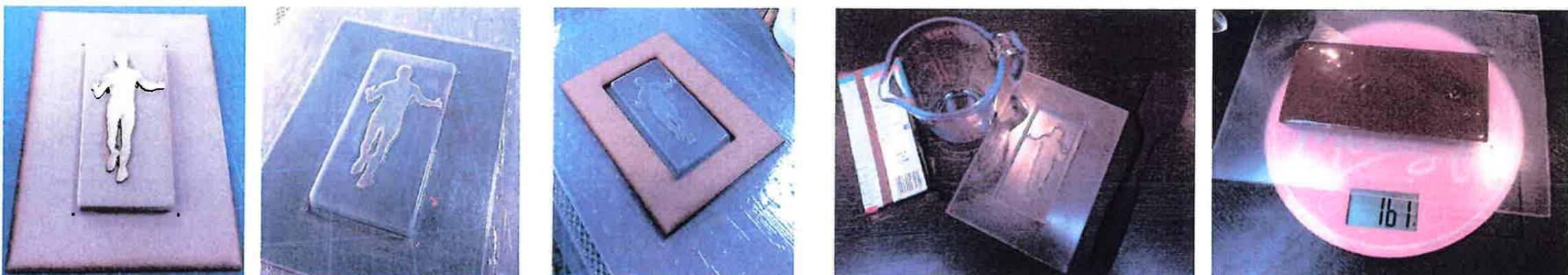
Step	Process	Tools and machinery	Safe working practice
6	Draw the rectangular shapes to make the vacuum formed mould and cut out the runner figure to go on to the mould. The MDF window that the runner is in will be used as a jig / template when cutting out the vacuum formed shape.	Computer and associated software (2D) design and the laser cutter	Ensure settings are correct for burning the 4mm MDF. Make sure the settings are not too high so as to burn the card and cause a fire. Ensure that the extraction system is on when the laser cuts to remove any smoke or fumes created.
7	Glue the layers of cut 4mm MDF together to form the vacuum forming mould and leave clamped under pressure for 12 hours.	Workshop vice, wood glue, 'Titebond' in this instance and a small brush to spread the glue around.	Wash hands to remove any excess glue that might be on your hands.
8	Set a marking gauge to 2mm and mark all round on the top surface. This will be the line to which I will sand to create a tapered edge so that the mould can be easily released from the formed shape once cooled.	Marking gauge	
9	Set the sander to a small angle to create the tapered edge. The picture below shows that I have out a try square up against it to show the tapered angle.	Disc sander, safety specs and try square	Ensure the extraction is turned on to remove any waste. Safety goggles should be worn. The work MUST be kept flat on the surface of the sanding table.
10	The figure was too big to fit onto the vacuum forming mould so I cut another one a bit smaller. Once the figure was cut and sanded I stuck it onto the tapered mould using wood glue. Once it was dry, I drilled some 2mm holes on the pillar drill through the mould, especially where there were enclosed areas where air would be trapped during the vacuum forming process.	Original outline file of the runner, laser cutter, pillar drill and machine vice and a 2mm twist drill.	Make sure that the depth stop is set on the drill so that you do not drill into the machine vice. Make sure the guard is closed and the vice is held tight.
11	Carry out the vacuum forming process. The machine needed to be turned on so it could warm up. The piece was put in the middle of the bed so that any stretching and thinning of the material would be kept to a minimum. It would also ensure that there was enough material around the outside of the mould to be cut to fit inside the package.	Vacuum forming machine, 'Formech 300X' in this case and a sheet of 1.5mm PVC	Be careful not to overheat the polymer sheet so that it sags too much, blisters or burns. Be careful with hot surfaces and not to burn your hands.



My first attempt at vacuum forming was not very successful. I do not think I had the polymer sheet hot enough and therefore it did not stretch enough. This resulted in several webs forming at the corners and some additional wrinkles on the flat sheet. I tried to re-heat and reuse the sheet given that it a thermoplastic which means it can be reheated and reshape but this was also unsuccessful so I made a new attempt. I also added a back to the vacuum form mould since I realised that I wanted a flat back to surround the shape and not one with dimples in from the bed of the machine.

# Manufacture

Step	Process	Tools and machinery	Safe working practice
12	The original MDF mould needed to be stuck to a flat 4mm MDF sheet to provide a better more aesthetically pleasing surface finish to the final vacuum formed product. Small holes also need to be drilled around the outside of the larger block so that there are no trapped air pockets created when vacuum forming.	Wood glue and a workshop vice to apply some pressure whilst the glue sets.	Wash hands to remove any glue and appropriate PPE to be worn when using the pillar drilling machine. Guards must be in place and the work held firmly.
13	The next step was to make a new vacuum forming mould. In this case I left the polymer sheet to heat up more and was a bit quicker carrying out the process in terms of turning the vacuum on when the table was lifted into the softened polymer sheet. I also applied a wax surface finish to the former so that it would release the formed sheet a little easier.	Vacuum former mould, wax finish and rag to apply it, vacuum forming machine.	Wash after using the wax and to follow all the instructions when using the vacuum forming machine taking special care with hot surfaces.
14	The vacuum formed sheet needed to be trimmed to the exact size so that it would fit into the already formed package. I used a laser cut template to fit over the vacuum formed shape which I was able to cut around with a craft knife.	Template, craft knife and cutting mat.	Take care to make several light cuts rather than one heavy cut. This will ensure that you do not run the risk of applying too much pressure which might break the knife or that you might slip and cut yourself or damage the work.
15	The 'Golden Ticket' was cut out using serrated scissors and then applied to the front of the box. In real-life production, this would be hot-foil blocked and printed on.	Mylar film, glue and serrated scissors.	Be careful not to cut yourself.
16	The chocolate needs to be warmed in the microwave to melt it ready to be poured into the vacuum formed mould. It only needs to be warmed to about 32°C.	Chocolate, spatula, microwave and microwave proof dish and weighing scales	Be careful not to spill any chocolate or to burn yourself by overheating the chocolate.
17	The 'Golden Ticket' will be printed onto some card and then put inside the golden envelope and sealed closed.	Gold coloured card, Mylar film for the envelope, glue	
18	Cut out two clear PVC discs which are to be used to make the tamperproof seals to seal the top and front cover closed.	Clear PVC self-adhesive film, hammer and wad punch to cut the circular discs. Scrap wood to cut the discs on	Be careful when hitting the wad punch so that you don't hit yourself.



The photographs above show various stages in the manufacture of the prototype. The final image shows the chocolate bar on a set of digital scales, measuring 161g. The original polymer vacuum formed tray weighed 1g and so the mass of chocolate is in fact 160g, which is some 40g short of the proposed weight calculated at 200g. Images of the final prototype are shown on the next page along with some text to describe how the prototype performs.

## Quality and accuracy



## User Feedback and analysis of the prototype

The very top image on the left shows the completed package with the two tamper proof seals in place to hold the package closed. Although it is difficult to see them, they are shown in two of the other pictures above, one holding the front flap closed and one holding the top flap down so you cannot see inside to see if there is a Golden Ticket. The rear of the package shows all the details about ingredients, allergens and nutritional information. I asked a potential user to take a look at the product and to open it. They found it a bit tricky to open the tamper proof seals, which is a good thing really, but they had to use a small sharp knife to cut the seals to get inside. They liked the colour and text of the front although they did make a comment about the text being a bit light in colour and difficult to read 'Marathon 2018'. They found the chocolate bar was easy to get out of the package although a few little bits got stuck in the mould which you can see in the image on the middle right photograph. They loved the Golden Ticket concept, although they said that it was not clear on the front of the box what the Golden Rectangle was but I had to explain that it was a prototype and I was not able to print onto the surface of the Mylar film. They did comment that they thought the chocolate bar would be difficult to break and that it should have some segments moulded on the back to help it snap into chunks. The last image shows all the separate component parts are easily separated out for recycling.

# Testing and evaluation

## Form:

The product should reflect the theme of running – the package does not reflect the running theme other than it mentions London Marathon 2018 but the chocolate bar does show a runner.

It should reflect the capital city and London landmarks – The package shows the skyline of London with some significant landmarks.

It should be easy to handle – the product is easy to handle but it was difficult to open the tamperproof seals other than with a knife.

It should be easy to stack so it can be transported both internationally and locally – it would be easy to stack and pack into boxes due to its regular shape and relatively small size.

## Function:

The product should be capable of capturing the users imagination and interest of potential users – the inclusion of the Golden Ticket for sure makes the product capable of capturing the users imagination

It should be used to raise money for national charities and good causes – the funds raised would be used to support the charities and good causes just like a lottery ticket does with a certain amount of cash being diverted

It should be used to promote the London Marathon of 2018 – this is the case as the graphics and wording certainly make it clear despite the colour of the text being a bit feint on the front

## User requirements:

It should try to involve users in helping out / raising money for charities involved with the 2018 London Marathon – the product does this well as the winners of the Golden Tickets will either present the winners medals or start the race itself

It should be easy to handle and use – it is a regular shape without any sharp edges, it was however noted that the tamperproof seals were a bit difficult to open

It should be something that can be used and enjoyed – the general feeling was that the chocolate would be enjoyed by all but it would be less appealing to diabetics

It should be low maintenance – the product as its stands requires no maintenance at all, other than to be opened and enjoyed

## Performance requirements:

The product should reflect the theme of running – the image and shape of the runner on the front reflects this but there is nothing overt on the front of the package other than the word Marathon

It should be easy to open, use or store – it is easy to store given its shape but is less easy to open than planned

The product should be clearly marked / labelled with any relevant info / legal requirements – all the requirements are on the box except the weight which as finished and measured as shown previously should be 160g

Any weights and measures should be clearly shown – no the weight of the chocolate bar is missing but is easily corrected

Any packaging should protect the product during transportation – the addition of a strengthening rib / sheet inside helps to stop the chocolate bar moving around inside and there is a little bit of room in case there is any depression on the box

## Materials and component requirements:

The product should use as few different materials and components so as not to place a high demand on resources in terms of materials consumption and that might make it difficult or too complicated to recycle – a small number of materials are used which can all be separated out as shown on one of the final photographs. The large majority of material is cardboard which is easily recycled

It should be made from locally sourced materials and components – this is difficult to assess for all materials but for sure the chocolate would be sourced from overseas

It should be easy to separate different and mixed materials / components for recycling purposes – all the materials can be separated, the only difficulty being the hot foil blocked Golden Ticket from the front of the package

## Scale of production:

It will need to be mass produced as it will be used to help raise money for charity on a large scale – it is only made as a prototype but all the individual component parts are capable of being mass produced very cheaply

It should be easy to handle – it is easy to handle being relatively small and compact, it was however quite difficult to open / break the tamperproof tabs

I asked the potential user who made the comments on the previous page to help evaluate the final product against the design specification.  
Green - Meets the spec, Red - fails to meet the spec, Black - no conclusion.

# Testing and evaluation - continued

## Cost:

It should be no higher than £10 with a proportion of that going to good causes – It was suggested by the user that £5 would be a good price to buy given it is for charity and the potential chance of winning a Golden Ticket

The product should cost as little as possible so as much profit goes to the charities and good causes – the materials are simple and the manufacturing processes are all quite basic even the vacuum forming so overall manufacturing costs would be low with possibly the chocolate being the most expensive item

## Sustainability:

The product where possible should use recycled materials and as few different materials / types of materials as possible - it is difficult in school to find out if the materials they supply are made from recycled materials. The cardboard could be but when in mass production, the polymer needs to be a new virgin material

The product should be kept to a minimum size if at all possible to reduce the demand on resources and to reduce the volume of any – **the package is already quite small and compact but it could be made a bit smaller given that the chocolate bar is quite small inside the whole package.**

I wrote a short questionnaire and asked 20 potential users. The questions and results are shown below

### Prototype testing Questionnaire

1. Is it obvious what the product is?

Yes    No    Comments

2. Is it obvious that the product is being used to support the London Marathon 2018?

Yes    No    Comments

3. Is it clear that you have the chance of winning one of five luck 'Golden Tickets'?

Yes    No    Comments

4. Given the product contains quite a large bar of chocolate inside, 160g, and you have a chance of winning one of five 'Golden Tickets' what price would you be prepared to pay given all the profits from the sale go to charities and good causes supported by the London Marathon.

£2    £3    £4    £5    more than £5

5. Is it clear and straightforward to recycle all the separate parts of the package?

Yes    No    Comments

6. Was it easy to open the package and the get the chocolate bar out?

Question 1



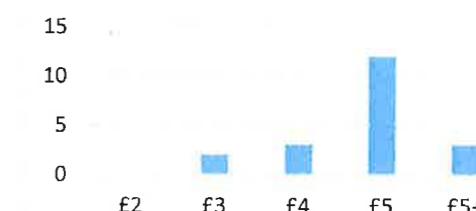
Question 2



Question 3



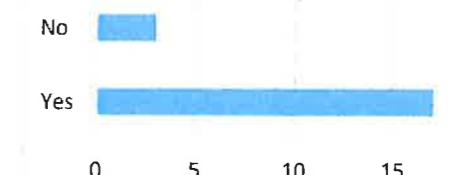
Question 4



Question 5



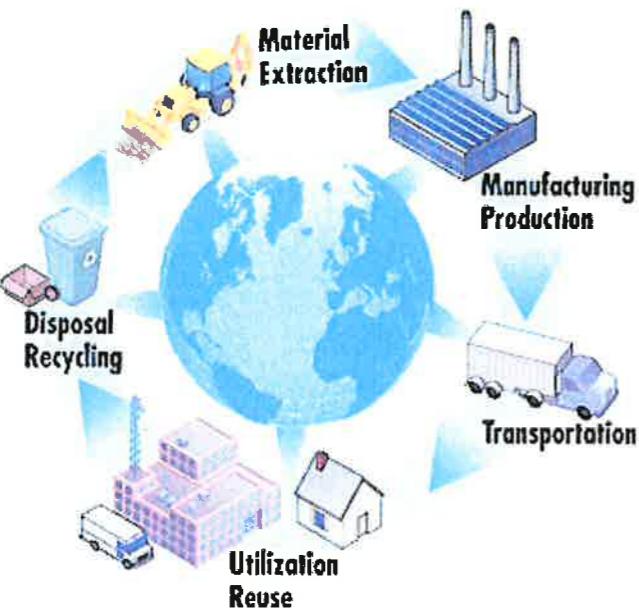
Question 6



## Conclusion of testing and evaluation

The results on the whole are quite positive and the product was generally well received. The main issue was that the 'Golden Ticket' on the front of the box had not been printed on to show what it was as it was just a Golden Foil rectangle. Once explained why it was not printed and what it was in relation to, those surveyed were quite excited about the prospect of winning and they said it would encourage them to buy one. The rest of the questions and results were supportive of the product. It was clear however, that there would need to be an advertising campaign to promote the product and concept of the 'Golden Ticket' prize but this could be alongside all the existing promotional material online, on social media and in the National Press.

## Testing and evaluation - LCA



The Life Cycle Analysis (LCA) of a product relates to the initial extraction of the raw materials in order to produce materials and components, through to transportation of goods and materials, to the use of the product at home and finally the recycling of the materials.

When carrying out a LCA, companies are very keen to try and reduce or minimise the environmental impact of the product and so in this case they would be looking to try to use recycled materials wherever possible and to keep any transportation to a minimum.

To this end, recycled cardboard could be used for the package but new 'virgin' material would need to be used for the polymer for the chocolate mould. That said, all the individual component parts are easy to separate and recycle at an individual material level, including the foil for the Golden Ticket, which there would only be five off in any case.

The biggest problem would be with the hot-foil blocked image on the front of the cardboard package in terms of material separation.

The chocolate would need to be sourced from overseas in terms of the cocoa bean used to make the chocolate. This cannot really be avoided in terms of supply but it would be sourced as a Fair Trade product and hopefully it would be transported using 'Green' energy.

The factory where the product is manufactured should also try to use 'Green' or as much renewable energy as is possible so as to reduce their dependency on finite fossil fuels.

Overall this product is considered to be a very sustainable product given it can be made from some recycled material, all the individual parts can be separated and recycled and it would be produced in the UK with just the chocolate cocoa beans being imported.

