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Hey 👋

My name is Nik and I am an industrial designer. I have successfully delivered hundreds of high impact projects while working in all stages of the product design and development process. From initial ideation and business planning all the way through to post-launch support and performance evaluation, I've been a part of it. With that experience I bring a holistic 0>1 product design process that is informed through first hand experience and not just anecdotal or third party knowledge.

I originally studied mechanical engineering before switching to architectural design, and that blend of knowledge informs how I approach design at both the micro and macro scale. Architecture taught me to judge every design decision at several scales all at once. Move a wall, the room changes. Change the room, and the floor plan shifts. That floor plan change now changes how people experience the building which can affect the envelope, then the street, the neighborhood, the city, and the wider world around it. Not every decision ripples that far, but thinking across scales like that has always been a part of my process. As a result, nothing I design exists in a vacuum and that has massive impact at handoffs.

Before I went to school for architectural design, I was working in manufacturing and product design for a company that had an extremely high sense of craft and that shapes my work to this day. Every little detail matters. Is it a G3 blend or is it a simple fillet? Who's the user, are they different than the customer? How long should this product last? How does the user perceive quality? I am constantly asking and answering these questions during my process.

As a design leader, I seek to push boundaries of the product that I develop and seek innovative yet elegant solutions. I also constantly work to mentor those around me and give them the opportunity to grow as well as teach me. I am not an expert in everything and even the things that I do consider myself an expert in I think there is always opportunity to grow and learn something new. I love working with people from different backgrounds, both professional backgrounds and in their personal life, because we all think about the same things but we think about them in different ways and with different perspectives and getting exposed to those different perspectives can open up new pathways for everyone.

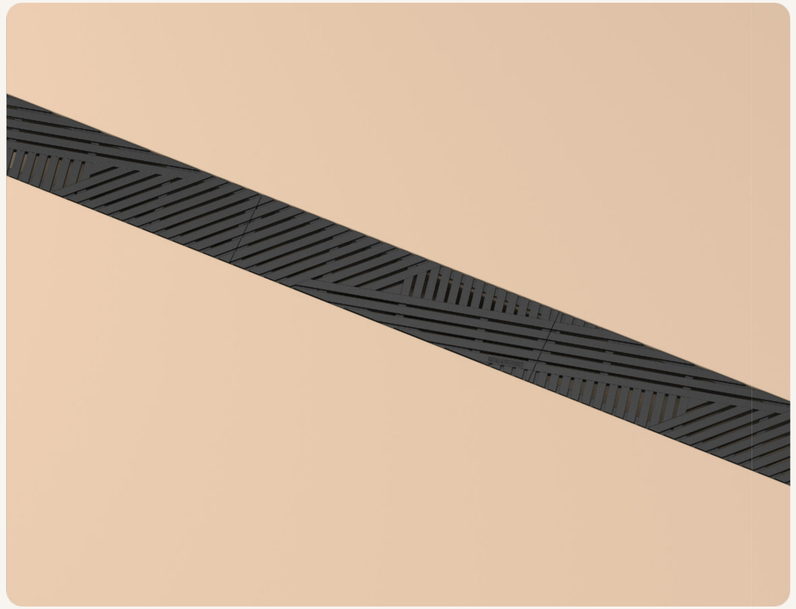
For this portfolio, I wanted to really limit it's scope.

It might come as a shock to you, but I can sometimes be a little long winded when it comes to discussing design. For this portfolio I selected 3 projects that I worked on over the past 2 years. Choosing these projects was difficult because for the past 8 years I worked at a company that did both standard products and bespoke, project based work. That means I have delivered hundreds of products over the years, so I have a lot delivered products to choose from. I ended up choosing Nest, Finn, and some work that I am just blanketing under DFX. Each one of these projects showcases something a little different and the following 23 pages just scratch the surface. Feel free to reach out if you have follow up questions as I am happy to answer them.

Projects

01

Nest Drain



02

Finn Seating



03

Urban Accessories DFM/DFX



Nest

Overview

Nest is a trench grate design that defies the standard symmetry and repetition that is typical in other trench grates by using a clever install process to create a pattern that repeats less often providing an installed pattern that feels varied and unique. It is meant as a complimentary design for contemporary architecture.

Core Goals

Create a grate that addressed shortcomings from our other grates around improper installation, 3rd party trough compatibility, and load ratings while providing a contemporary design.

Outcome

Nest led to the partnership with the leading manufacturer of troughs, the development of new installer friendly features, and significant client specifications.

reddot winner 2026



Problem

Long Runs

In long runs of grating, repeated patterns become more noticeable and undesirable. Nest needed to avoid that.



Some designs become visually repetitive over long runs which is a common condition in trench grate installations

3rd Party Verified Load Ratings

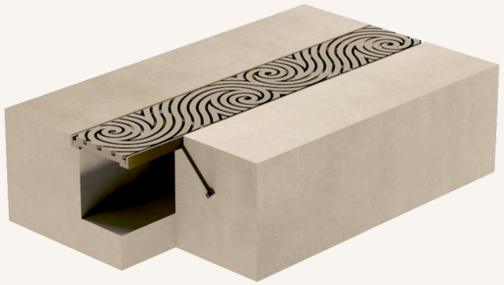
We used load ratings that met AASHTO standards but it was never really developed for smaller grates and we infrequently sent out for 3rd party testing and certification. As a result, we frequently had people ask for certs we didn't have.

Heel Proof and ADA Compliant

The ADA guidelines for grating call out a few requirements for openings in the walking surface. The most important are that the openings should be no wider than 1/2" and they should not run parallel to the path of travel. To add on to the ADA requirement, most jobs desire narrower openings, known as heel proof, that are typically 1/4" or narrower. Nest needed to meet ADA guidelines and provide a heel proof grate.



Other manufacturers' troughs arrive ready to place and pour concrete



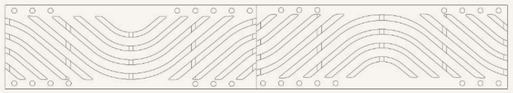
Urban's trench frames require complex concrete formwork to form a trough (all concrete is done in field)

Other Manufacturer's Troughs Are More Desirable

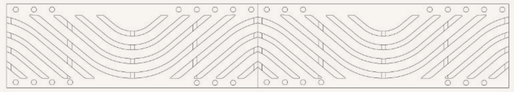
At Urban Accessories, we had our own framing system but it was very barebones and we were way behind other trough manufacturers in sales.

Installers Frequently Orient Grates Incorrectly

While photographing projects we found that around 40% of the installs with grates that weren't fully symmetrical had grates that were incorrectly installed. While it just an aesthetic problem and not a functional one, it still provided an opportunity to improve the install experience.



Single direction symmetric grates installed with rotation (aesthetically compromised and a common occurrence)



Single direction symmetric grates installed without rotation (correct installation)

Exploration

Other Manufacturers Troughs

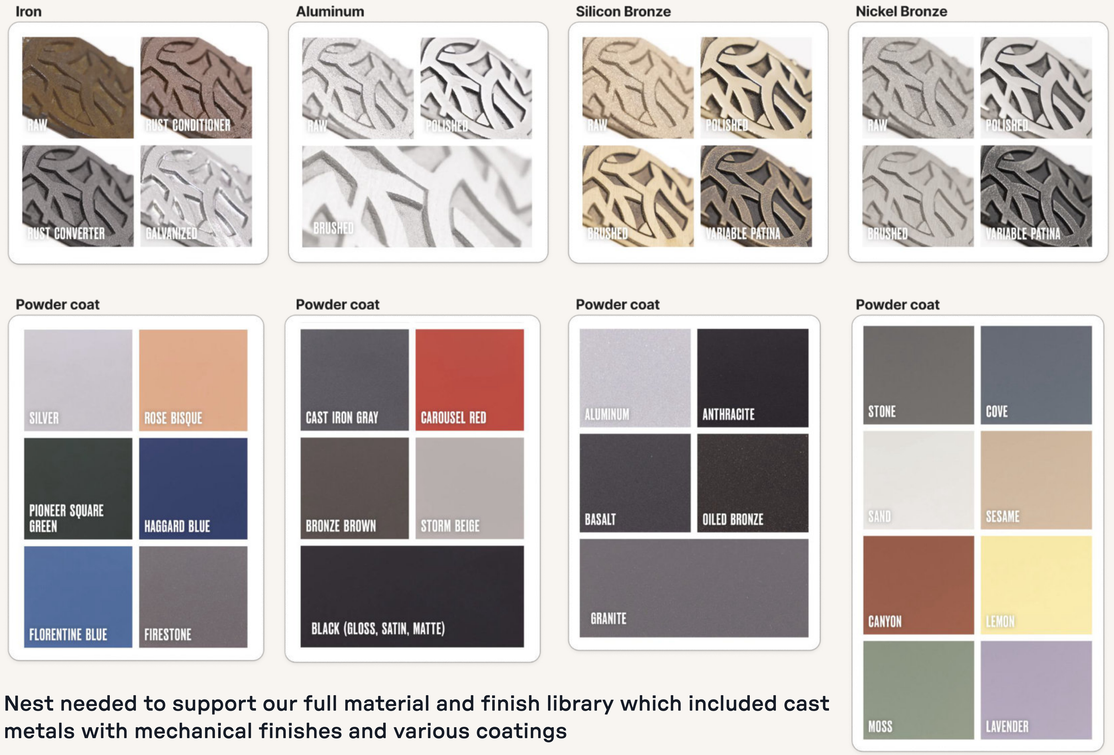
During our exploration phase, I spoke with installers and specifiers in the industry about our frame system and the trough systems that other manufacturers provided. We discussed the install process and the drawbacks of them having to engineer and form their own drain runs. We also had zero installation instructions meaning that specifiers and installers had a lot of uncertainty about where to even start. Other manufacturers provided a simpler install experience by providing pre-sloped drain runs and a simpler install experience. Through conversations we found that specifiers wanted the quality and aesthetics of our grates paired with the simplicity of other trough systems.

Materiality

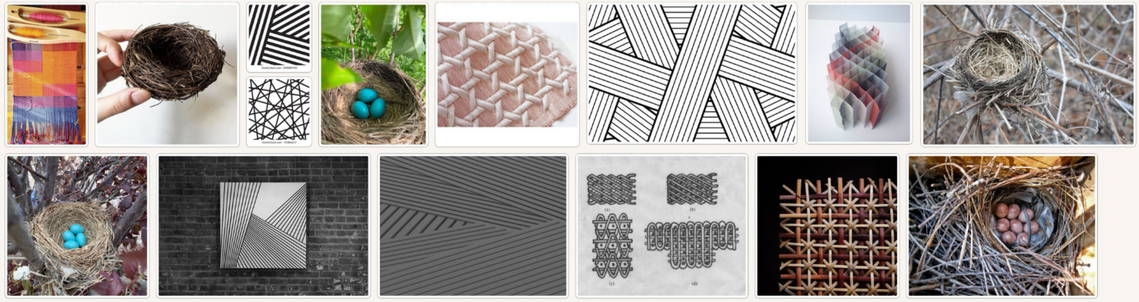
Specifiers want options and we offered the most of any manufacturer for both materials and finishes. We would continue offering our standard material options of two types of iron, aluminum, silicon bronze, and nickel bronze as well as our robust collection of finishes.

Meetings with Specifiers

Through meetings with architects, we started to see a desire for something modern that matched contemporary architecture. Asymmetry, simple geometry, and layers were ideas that we heard from multiple architects so we started forming a mood board.

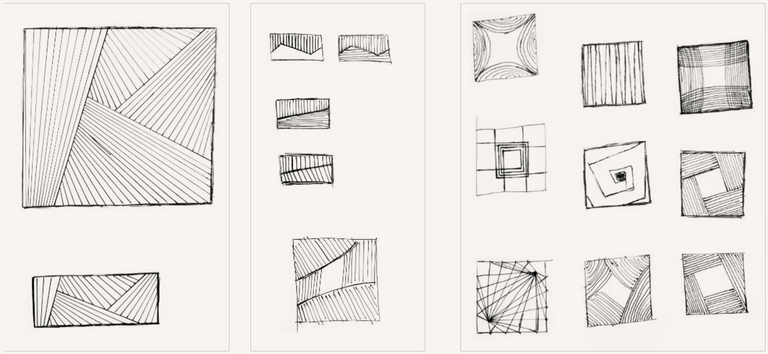


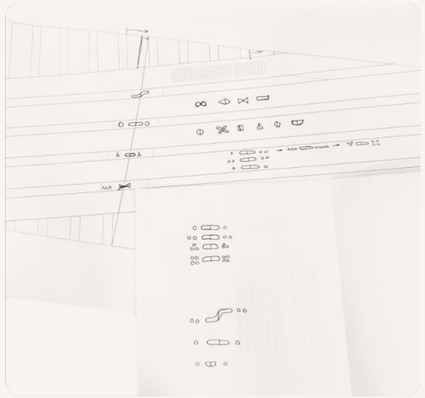
Nest needed to support our full material and finish library which included cast metals with mechanical finishes and various coatings



Nest drew inspiration from nature and weaving for the final design aesthetic

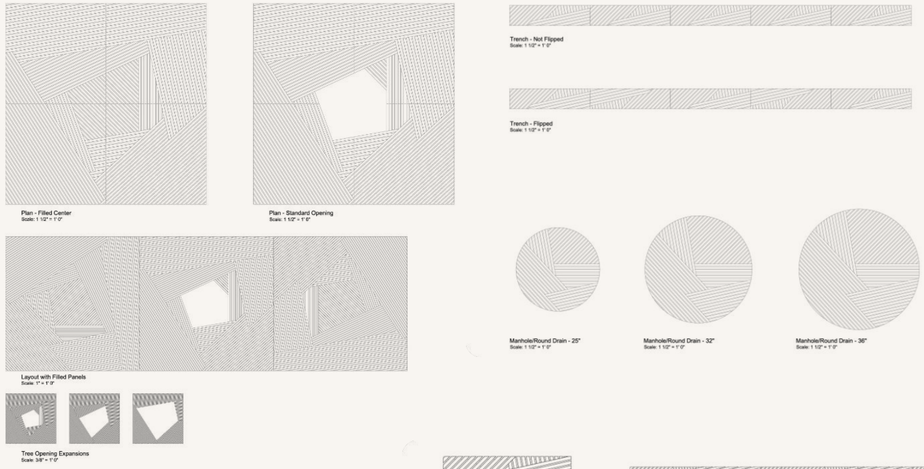
Initial Design





Initial Scope and Streamlining

When I started developing Nest it was going to be part of a much larger family of grates. However, as we looked at sales potential and cost of the full system we pared the system down to just a trench drain. Tree grate sales are in a steep decline and our sales of manhole covers were never good enough to justify the development costs. Trench grates however were seeing solid growth and had a much higher ceiling.

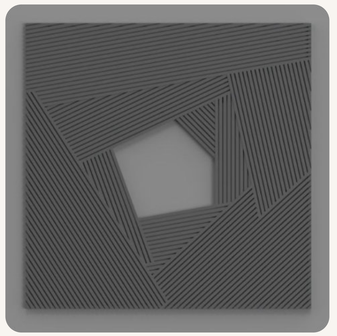


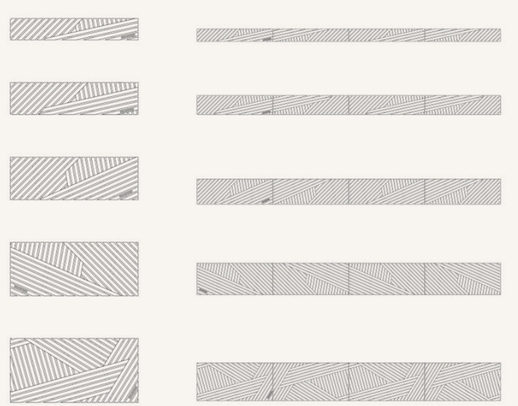
Sketching+Ideation

Nest's form came from the layering of twigs that birds use to build their nest. The pattern itself went through a few iterations and tweaks to make sure we wouldn't have any problems with white iron or general difficulty in casting. I developed 9 different patterns that would then be developed into trench grates.

Matchlines and Install Clarity

The goal here was to give installers a simple way to ensure that the grates are being oriented correctly while not being visually distracting when installed. Letters were considered but they were too visually strong and we had people that still asked questions about install. We then explored a few different symbols but we needed something that was easy to cast and couldn't be confused. Where I landed was two different matchlines, one that was dog-legged and the other straight.





Refinement

Load Ratings

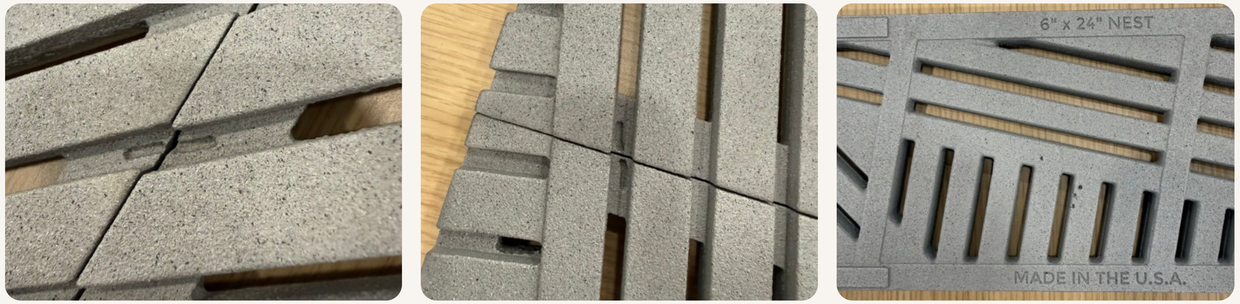
For our load rating issue we began looking at different standards for load testing. The AASHTO load rating we used in the past used a 9”x9” pad to apply the loads to the grate. The problem with that was that the p[ad was always the same size, so for a grate that is narrower than 9” you’d run into an issue where the concrete to the outside of it was actually carrying part of the load. We switched to a standard that was more common in Europe but that actually changed the size of the pad that the load was applied with so that the full load was always applied to the grate and would provide better testing results.

Prototyping

Prototyping sand castings is interesting because you kind of just have to cast them to actually see a lot of the problems show up. During our prototyping we were seeing some of the matchlines had material in them that we needed to solve. We modified the tooling to actually have a tiny bit of extra material in those areas that would then be broken off and reveal the clean matchline.

Tooling

Historically, we always set a single casting on each pattern board, which with our smallest flask size had a lot of unused space in the mould. With Nest, we had two variants that we needed to cast and were really constrained on space for patterns and for each material we needed to create a different pattern. We decided to just double the grates up on the pattern board so both variants would be cast at the same time and reduce the amount of wasted chemicals. This seemed simple enough but we had a lot of problems with increased porosity and tearing from the change which required a lot of tweaks to our tooling to solve.



Excess material in the matchlines was observed as well as unusual porosity in the cope of the castings



Minor tearing was observed in some of the initial aluminum castings requiring rework on the patterns

Pika

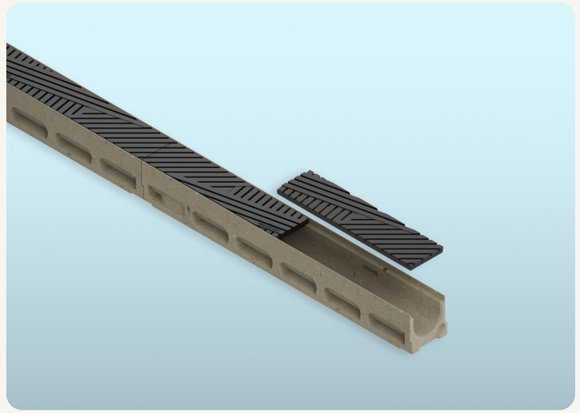
No, Not The Yellow One

During the development of Nest, we wanted to solve our trench drain frame issue but we didn't have the resources to develop a trough system from both and engineering and manufacturing perspective. Even if we did, the main players in the space still would have a much more robust offering than we could develop in the short term. With that we decided to start engaging some of the existing players that we had relationships with and see if they were interested in pursuing a partnership. We found a few potential partners and begun developing Pika, a trough system that worked with our grates.



Partnering with a Worldwide Leader

We ended up partnering with a worldwide leader in the drainage industry as we were able to tap into resources that we didn't have access to without them. They were able to solve our 3rd party testing needs as well as give us the keys to robust product line that we could modify to work seamlessly with our products. Pika turned into a massive project that led to the redevelopment of a big chunk of our existing product line and a marketing effort to go with it started with Nest and allowed us to develop a refined system for bolt downs and installation as well as solve many of the concerns that installers talked to us about.



Pika Was Spun Off From Nest Development

Pika ended up being a much larger project than just the Nest so I am not going to cover it in-depth here but it became a project that I led that touched on branding, partner presentations, product design and strategy, digital design, and market strategy.

Outcome

A Robust Product That Began A Shift

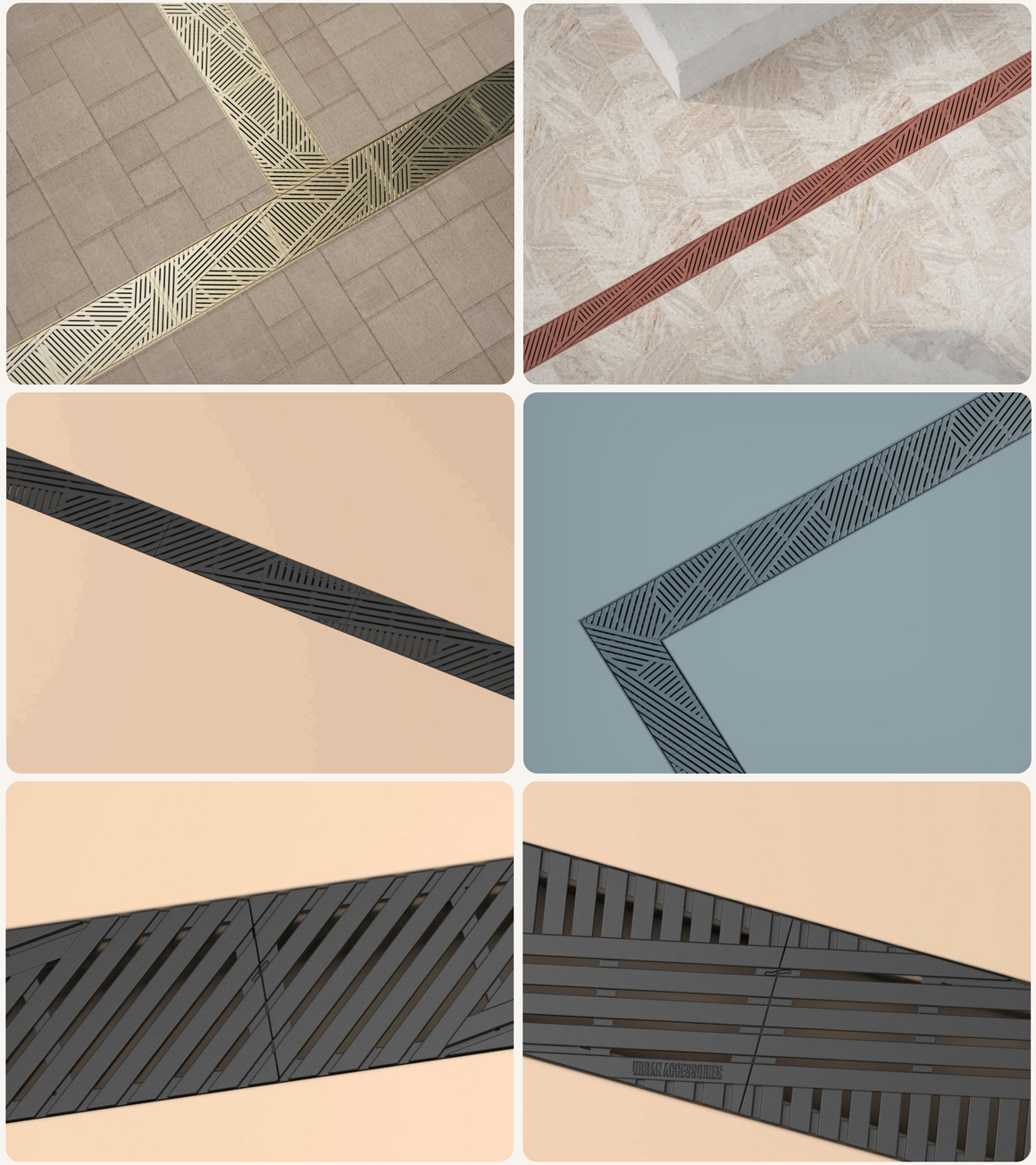
Nest started a lot of new initiatives that would see Urban Accessories shift their thinking on trench grating. Matchlines were the new norm and were planned to be added to all grates that had special install requirements and with the new load rating system all of our trench grates were going to undergo testing to the updated spec. In addition, Nest was the genesis of our partnership with a worldwide leader in drainage that was expected to increase our sales of trench grates at least 30% over the next 5 years. It also saw tremendous sales success and went from launch to a top 5 pipeline generator within it’s first year of launch.

Winning a Red Dot

Nest was entered into the Red Dot design competition and marked the first Red Dot that Urban Accessories was awarded and was the first time that we had been on the global stage.

Bringing Urban Accessories to Market Leader Status

Urban Accessories was well known for having attractive and highly customizable designs that customers loved but the lack of a true trough system held them back from being a true contender in trench grating. With Nest and the Pika system it provided the opportunity to begin working towards a market leader position.



Finn

Overview

Finn is an outdoor seating line that blends Scandinavian and Japanese styles that was designed as a reflection of the city of Seattle for the Seattle Parks Department. The benches would be featured in every park in Seattle, including the high visibility Olmsted parks.

Core Goals

Develop a bench that felt connected to Seattle while being easy to maintain, relatively budget friendly, and hold up to the harsh conditions in parks and waterfronts.

Outcome

While Seattle Parks did not end up continuing with this project, Finn has gone on to be further developed into a broader seating system consisting of a standard length bench, a 2 person settee, and a single person chair.



Problem

Seattle’s Benches Are In a Crisis

Seattle’s park benches have a bit of an identity crisis. There are 4 different benches that are “standard” for the parks department. None of them are unique to the city, and one of them was designed specifically for New York City. Add that to the fact that many of the benches are in disrepair, there was an opportunity to come together and create something iconic for the city that also ensured people had a place to rest and enjoy the views of the PNW.

Bench Audit

When the parks department came to us they were wrapping up a bench audit where they were exploring how many benches were in poor shape and how long they had been in disrepair. What they had found during their audit is that they were maintaining a huge range of different benches that was making it difficult to stock replacement parts. There were 4 different designs they were maintaining that each had small variants in their mounting options and materials and they varied in price and complexity to install.

Accessible Seating and the ADA

The Americans with Disabilities Act and the guidelines for public spaces that came with it are fantastic, but we’ve learned a lot since 1990 and some of the guidelines are confusing. Outdoor seating frequently gets attributed under Section 903 of the ADA Guidelines, despite it being clarified that it doesn’t apply to outdoor seating, and the issue with that is that it creates seating that is uncomfortable and is solving for a problem that doesn’t really exist. Section 903 is meant to make transferring from a wheelchair to a bench easier in places like locker/fitting rooms, saunas, and courtrooms where a wheelchair user might need to be out of their chair. A park bench is not a place where wheelchair users typically would transfer and by applying these guidelines it can make it harder for other users with reduced mobility to use the bench. For this bench we would create accessible seating that anyone would be able to enjoy.



Existing bench examples were largely in disrepair and consisted of multiple aesthetic and install styles.

Exploration

Existing Benches

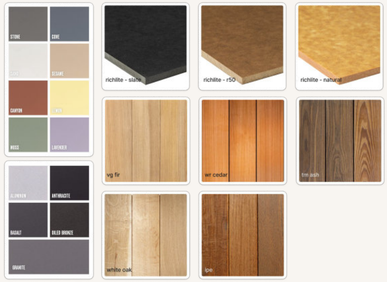
The existing benches in the city were broken into 4 main types: cast-in place concrete plinths with wood slats, pre-cast concrete plinths with wood slats installed with concrete anchors, metal benches cast in new concrete with wood seats, and metal benches with wood seats that are installed in existing concrete. All of the benches had simple wood seats that allowed the maintenance team to buy wood and cut it to size for replacement slats but they all had different sizes for the slats, so they couldn't just just a bunch of slats and keep them stocked. Full replacements of benches were also a nightmare because many of the benches required concrete work to be replaced and the category of benches that didn't were basically a footnote in their bench population.

Meetings with the City Planning Team

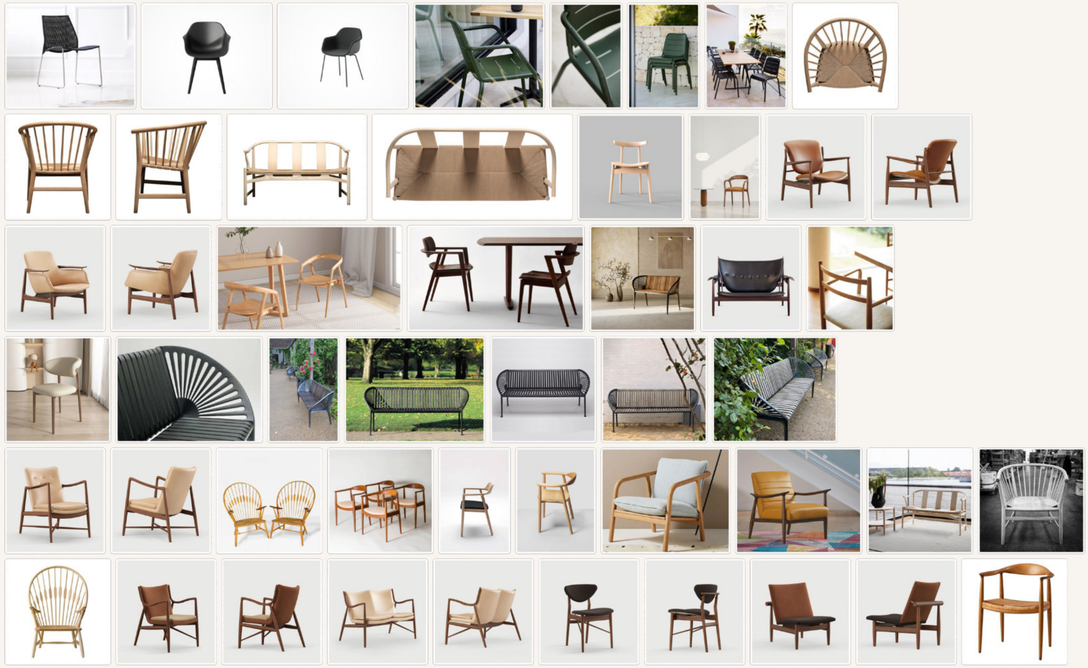
In my meetings with the city, I wanted to dig deep into what they wanted to get out of this bench. Was it just something to sit on and to be as cheap as possible, or was it a way to connect with the city? As we talked more it became clear that it was the latter and we talked a lot about the cities history and how these benches should feel special and that they all have the opportunity to be someone's favorite bench in the city. There were a lot of benches that would be installed at viewpoints and the existing benches didn't feel connected to the city and they were cold and uncomfortable. Developing a bench that made you want to grab a cup of coffee and a blanket and cozy up on as you take in the view of Lake Washington was critical.



Due to the complexity of repairs, many benches would end up out of service and in need of replacement.



Our material palette was inspired by the client's desire for durability and a connection to locally sourced woods and materials.



A desire for an elevated aesthetic that connects to the city was a top priority. The blend of Scandinavian and Japanese culture in Seattle was mirrored in our inspiration where we primarily looked at Japanese and Scandinavian chair and bench design.

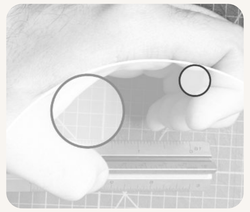
Initial Design

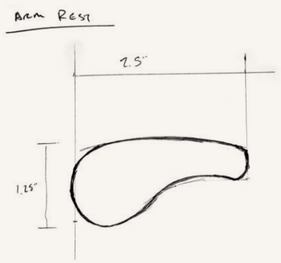
Materiality

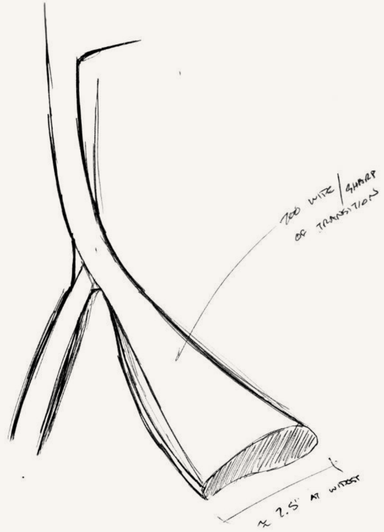
The reference images were filled with beautiful sculpted wood chairs and they all evoked this sense of comfort and coziness that was going to be so key. Cast metal instead of formed was essential to help with the sculpted nature of the bench. With sand castings we would get this ever so slight variation between each bench and they would feel like they were made by hand rather than machined which would lend to that unique coziness that we were pursuing. With a powder coated finish and a Richlite or metal seat we'd have incredible durability in the harshest locations while warm wood seats could be used in areas the conditions were less intense.

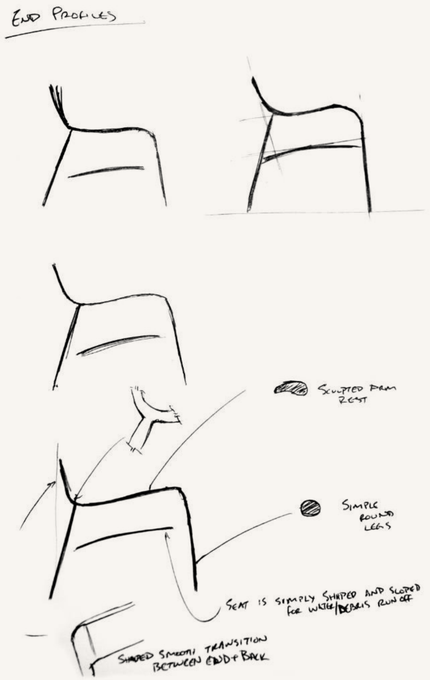
Sketching+Ideation

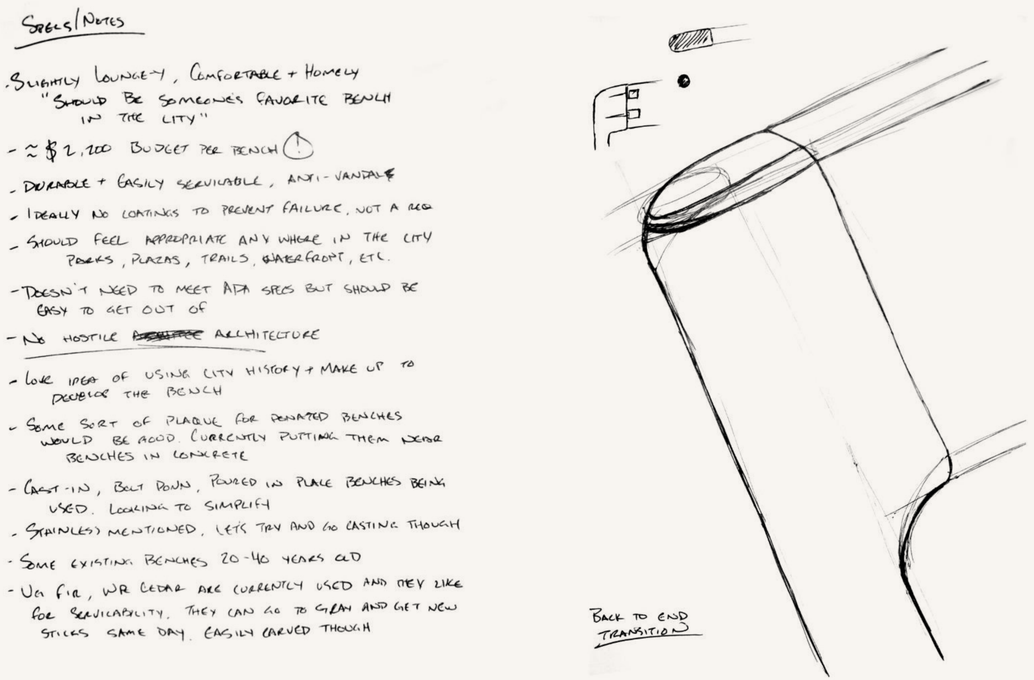
With this bench, the ends were the critical piece. That was were I'd pour the most time into since those were going to be challenging to cast and they were the piece that would have the most sculpting done. The elevation of the bench, the arm profile, and back to bench end transition is where I started and from there I would start moving into 3d and working through the surfacing

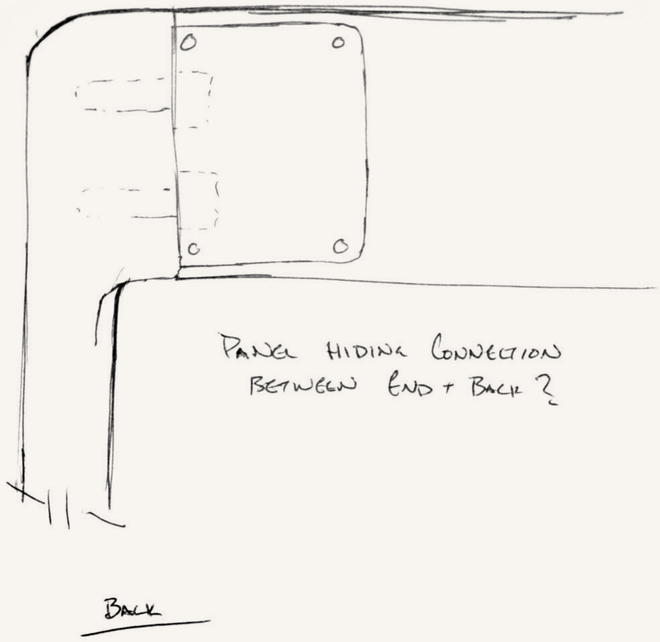












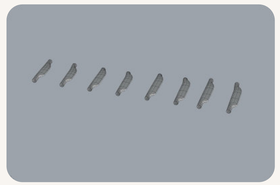
Refinement

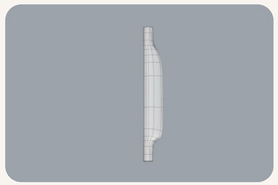
Seat Profile

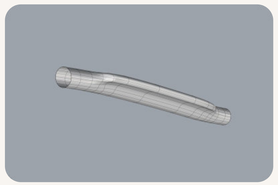
With this being a bench that should encourage people to sit and admire the views, the seat was given a slightly lounge-y shape and seat angle. It needed to be easy to get in and out of so giving it a full lounge profile didn't make sense. As an aside, there are guidelines in the ADA about seat profiles for public seating but they are outdated and don't actually solve the issues of accessible seating. The dimensions that the ADA deems acceptable were not used for this bench but there was significant consideration in providing a seat that everyone can enjoy.

3D Development

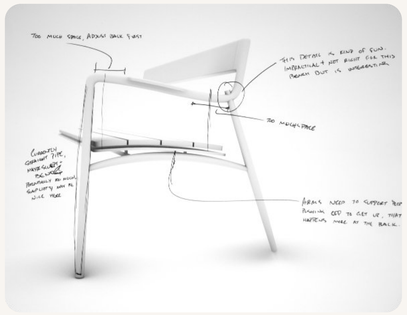
The arm rest was where I spent a lot of time refining the shape in 3D. The shape itself was derived from hand mechanics and how your fingers are capable of bending at a much tighter radius than your thumb. The arm rest needed to accommodate for that while also being a comfortable place to rest your arms while sitting and not getting in the way and catching clothing or straps as someone moves past.

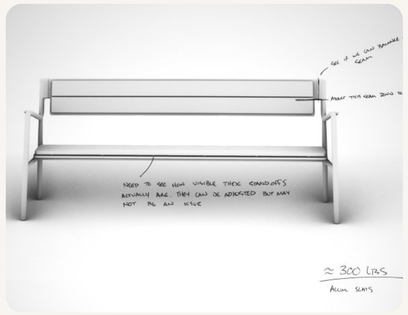




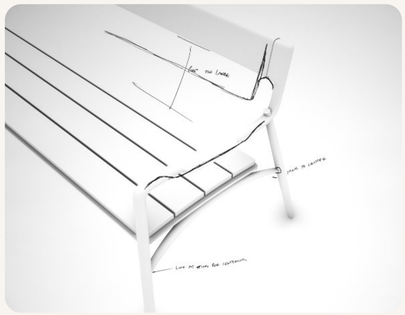




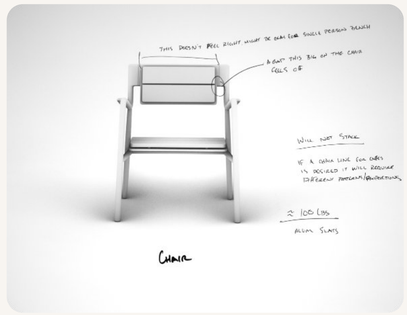


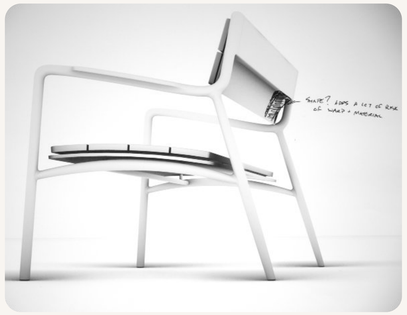


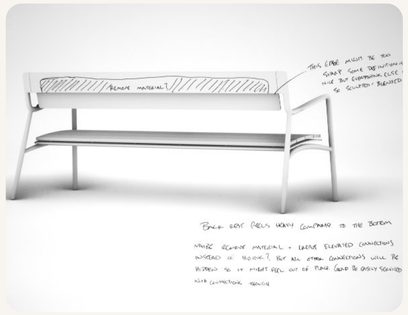


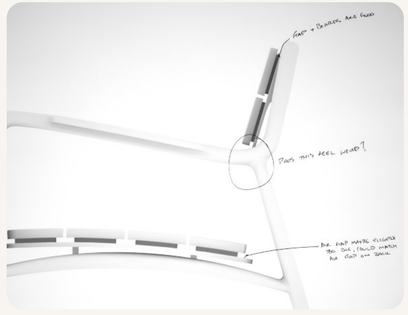




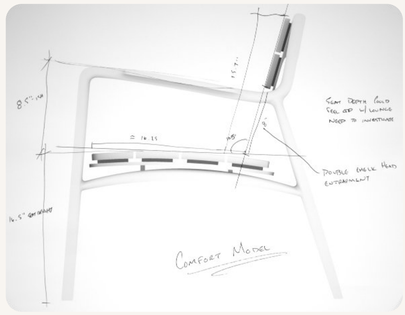














Outcome

Bench, Settee, Chairs, and more

Because of the focus on keeping a lot of the sculpting constrained to the bench ends it created an opportunity to create a family of seats. The original bench size was intended to fit 3 people but by shortening the seat we were able to create a 2 person settee and single person chair, all while using the same patterns for the bench ends and making simple modifications to the patterns used on the seat itself to keep tooling development minimal. The chair kicked off additional products due to it feeling a little compromised in it's proportions and being too heavy to use for movable plaza and hospitality seating (it weighs 50-100lbs depending on seat material). This led to further development of seating and tables that was more focused on that market that still matched the bench.

Pattern Development

With the shape of the bench ends it provided a great opportunity to hone my pattern design and really get me thinking about non-planar part lines. Despite the complex shapes, there was only one place where a core was needed (underneath the arm to allow the convex shape) and it would cast exceptionally well as a sand casting. It also opened up our pattern makers to new ideas and some of the lessons learned here transferred to other patterns.

City of Seattle Parks Department

With this project we were also able to build a really strong relationship with the City of Seattle and their Parks Department which created a strong pipeline for us to work with them to deliver bespoke products on projects throughout the city.








Urban Accessories DFX

Overview

At Urban Accessories, I worked closely with manufacturing as the primary designer and engineer for products. During that time I implemented DFX principals to reduce the cost of manufacturing as well as increase the quality of the products we delivered. This project focuses primarily on my work on our patterns and grating but is just one example of design for excellence that I brought to Urban.

Core Goals

Reduce raw material used, reduce time spent in chip and grind, reduce the amount of variation between grate dimensions, and enhance the finished product quality.

Outcome

60% savings in labor cost and a 35% reduction in raw materials needed and a higher perceived quality in bronze and aluminum castings.



Problem

Nominal Sizes Were Just That

We had two major dimensional problems. The first was that the each style had different actual sizes for the same nominal size. With our product lines, we had core sizes that were available in all of the different styles (48”, 60”, 72” square and round as well as a handful of rectangular sizes) but the problem was that the dimensions were in consistent. For example, if we called out 48” as the nominal size the actual was between 47-5/8” to 48-1/4”. This caused a ton of confusion in the shop and with our clients and required we check dimensions for a grate anytime we would build a frame or when a client needed exact dimensions which when finding a pattern could sometimes take 3 days, we create a huge problem for our CX.

Thickness of Grates Was Not Standardized

Our second dimensional issue was that the thickness wasn’t standardized. Any category of grate could have a thickness between 1/2” to 1-3/4”. With the construction of our frames, this meant that we had to buy a huge variety of angle stock and some sizes were unavailable in certain materials.

Excessive Clean Up

As patterns age, they have the tendency to warp or get beaten up. This can lead to problems like increased finning/flashing in the casting or the need to fill gaps and holes that are present in the pattern. Some of our patterns were 30+ years old and made with less-than-ideal materials and would create castings that needed a lot of time in chip and grind.

Undocumented Changes and Inconsistent Aesthetics

As we built patterns over time, different pattern makers had different ideas of what looked good. What that resulted in was some products looking wildly different across their size range. They also would frequently deviate from provided drawings leading to the need to go measure patterns to verify dimensions rather than just being able to look at drawings.

Nominal vs Actual Sizes in Core Size Tree Grates

Nominal Size	48”	60”	72”
Actual Sizes	47-5/8” 47-11/16” 47-3/4” 47-7/8” 48” 48-3/16” 48-1/4”	59-11/16” 59-3/4” 59-7/8” 59-29/32” 60” 60-1/8” 60-3/16” 60-1/4”	71-1/4” 71-5/8” 71-11/16” 71-3/4” 71-7/8” 72-3/16” 72-1/4” 73-5/8”

Grate Thicknesses Across Product Line

Product Type	Tree	Trench	Drain	Manhole
Thicknesses	3/4” 1” 1-1/8” 1-1/4” 1-1/2” 1-3/4”	3/8” 1/2” 9/16 3/4” 1” 1-1/8” 1-1/4” 1-1/2” 1-3/4” 18mm 20mm 30mm	3/8” 1/2” 5/8” 3/4” 1” 1-1/8” 1-1/4” 1-1/2” 1-3/4” 2” 18mm 20mm 30mm	3/4” 1” 1-1/8” 1-1/4” 1-1/2” 1-3/4” 2” 3”

Planning

Scope Establishment

For this project, the design process where I'd rework the aesthetics and sizes was the easy part. The process changes within the organization as well as the tooling changes were going to be incredibly challenging to both develop and implement.

Roadmapping and Phasing

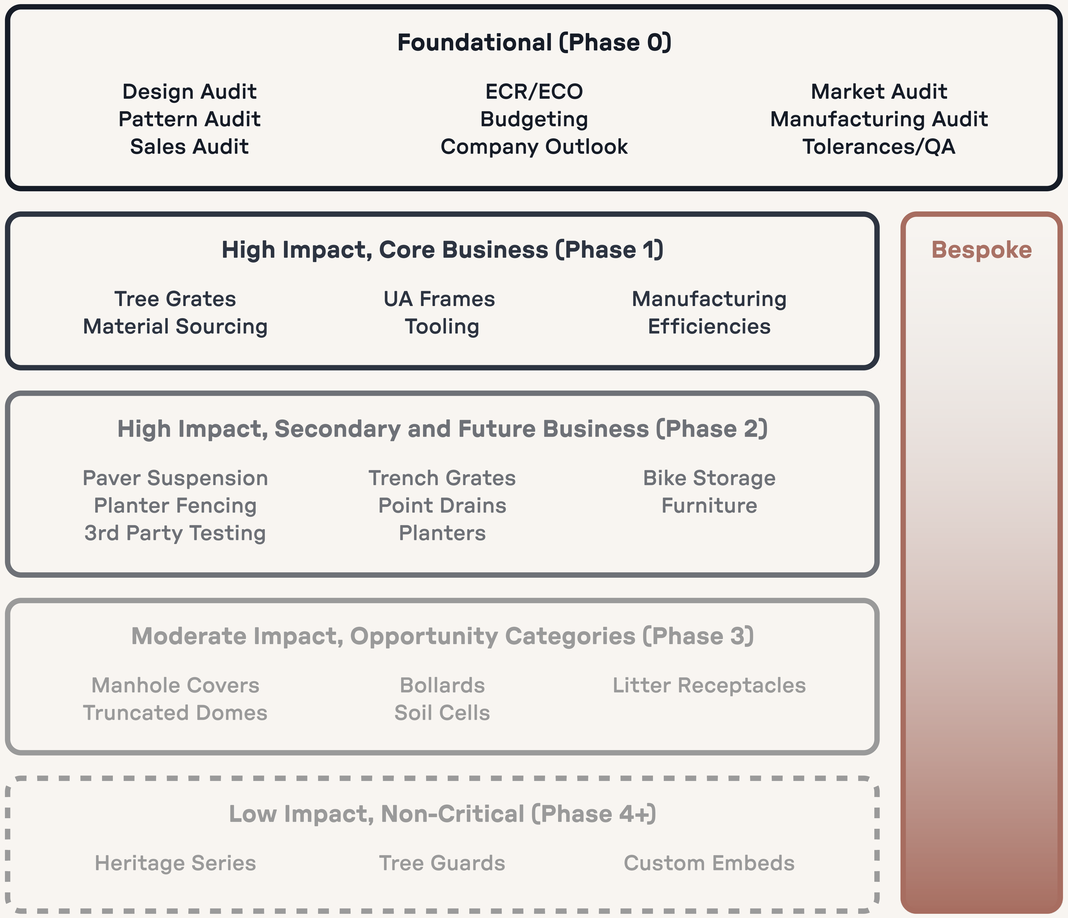
At the time, we had no defined process for ECRs, 3rd party testing, or true budgeting so there was a ton of foundational work that needed to be established before pen was put to paper to define the aesthetics of our new grates. Using sales data, organizational goals, and data gathered from the pattern audit, I developed a roadmap where we were able to set priorities and break off work into manageable bites and look at it as smaller sprints instead of a single multi-year engagement. We would build the foundation first, then tackle high impact tasks before moving onto less critical products.

Gathering Actionable Data

We knew things were broken and that we needed to make changes but we had no actionable insight into where things were broken and where the biggest wins were. Part of planning was going to be to audit each department as well as do a market study to help form our goals and direction. We also needed to sit down and put together a plan for where we wanted to be in the next 5 years and work back from there. No sense in working on product lines that we didn't want to be involved in long term.

Bespoke

About 30% of Urban's business was bespoke product as wasn't something that we could just pause while we figured everything else out. It was going to have to continue running in parallel with all of the other tasks and have small improvements made as we went along.



Jumping Forward

What Isn’t Being Covered Here and Why

As the leader for this effort, I did a ton of work in that foundational phase that I am not going to cover in this portfolio. As a major piece of the Strategic Leadership Team and the Head of Design, I was a major player in the business audits and process improvements. I could write pages upon pages about those projects but I want to focus on the design improvements made and the design thinking behind those changes rather than implementing processes.

Since this was more of a project that was about redeveloping existing products there isn’t going to be any discussion about CMF. While during this project I did work to develop refined finishes to eliminate rust issues in our bronze and aluminum materials and enhance the aesthetics of our brushed finishes, those aren’t a critical piece of this project and are omitted.

Exploration

Material Availability For Frames

Steel angle was available in pretty much any size we might need, but aluminum, stainless steel, and especially bronze were a lot more limited in the sizes that were available. Every size we used was 1/4” wall thickness but bronze was next to impossible for us to source without doing a mill run in certain sizes and with the multiple sizes we were trying to work with and that lack of sales of bronze doing a mill run didn’t make sense. So I engaged our suppliers to find what sizes were available off the shelf and which ones didn’t even exist to help inform our sizing.

Existing Angle Sizes

- 1/2” x 1/2” x 1/8”
- 3/4” x 3/4” x 1/4”
- ● 1” x 1” x 1/4”
- 1-1/4” x 1-1/4” x 1/4”
- 1-3/8” x 1-3/8” x 1/4”
- ● 1-1/2” x 1-1/2” x 1/4”
- 1-3/4” x 1-3/4” x 1/4”
- ● 2” x 2” x 1/4”

Materials

- Steel
- Stainless Steel
- Bronze
- Aluminum

● = Available in All Materials

32 Unique Angles

Critical Sizes

Looking at sales data and specification data, I developed a list of what were deemed as critical sizes for our rework as well as a broader list of new standard sizes. Critical sizes were determined by historical sales data and would be the priority for retooling while the other sizes would be designed at the same time but those patterns would be built on an as needed basis. This would be done to keep aesthetics cohesive while spreading out the cost of the project.

New Standard Sizes

- 36” Square+Round
- 48” Square+Round
- 60” Square+Round
- 72” Square+Round
- 84” Square+Round
- 36” x 60” Rectangular
- 48” x 60” Rectangular
- 48” x 72” Rectangular
- 48” x 96” Rectangular
- 60” x 84” Rectangular
- 72” x 120” Rectangular

16 Standard Sizes

>

Critical Sizes

- 36” Square+Round
- 48” Square+Round
- 60” Square+Round
- 72” Square+Round
- 84” Square+Round
- 36” x 60” Rectangular
- 48” x 60” Rectangular
- 48” x 72” Rectangular
- 48” x 96” Rectangular
- 60” x 84” Rectangular
- 72” x 120” Rectangular

9 “Core” Sizes

Auditing 2,000+ Patterns

Before we got into the design and development process we needed to audit our current patterns. Over 50 years we had amassed over 2,000 patterns that weren’t organized. We knew there was a fair bit of them that would get thrown away or were in awful shape but we needed actual data on how many. We developed a system to photograph each one and pull sizes of every pattern and then throw out any patterns that weren’t worth keeping. After the audit we were able to remove about 20% of our patterns from storage.

Immediate Impact

Too Many Angles and Stock Disruptions

One of our biggest issues lied with our frames and specifically with our material needs and stocking. As previously shown, we were trying to keep track of over 32 unique profiles and materials just for our frames and because of there being no consistency in what was needed for orders we couldn't really stock anything. This meant our material costs were constantly in flux and at risk of stock disruptions.

3/4" and 1-1/4"

Looking at the availability of angle, anecdotal evidence, and historical load rating testing two thicknesses made sense to start with, 3/4" and 1-1/4". These would be the sizes that we'd pursue for all of our grates moving forward. 3/4" was to be used for any grates under 36" in their longest direction and 1-1/4" would be used for all others.

What About Immediate Fixes?

This project was going to take years, so how can we get immediate benefit? With these new thicknesses we were able to either add feet to the cope side to thicken the grate or machine off some of the cope side to thin it out. Both options would take less than an hour in most cases and didn't need to be run through our pattern shop and could be done as new jobs came in. This solved our biggest issue with minimal cost and allowed us to start working on bigger changes.

Existing Angle Sizes

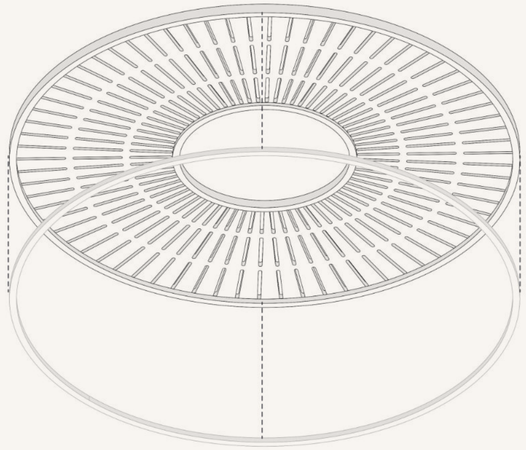
- 1/2" x 1/2" x 1/8"
- 3/4" x 3/4" x 1/4"
- ● 1" x 1" x 1/4"
- 1-1/4" x 1-1/4" x 1/4"
- 1-3/8" x 1-3/8" x 1/4"
- ● 1-1/2" x 1-1/2" x 1/4"
- 1-3/4" x 1-3/4" x 1/4"
- 2" x 2" x 1/4"

Materials

- Steel
- Stainless Steel
- Bronze
- Aluminum

● = Selected Angle Sizes

From 32 to 8 Unique Profiles



Additional cope ribs to be glued to existing patterns

Initial Design

Fresh, But Not Too Fresh

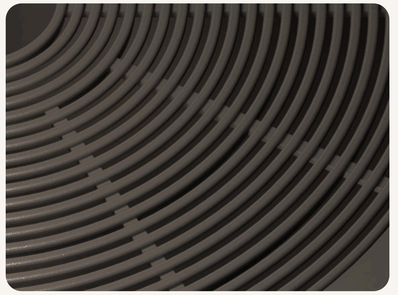
Because the existing patterns had been created by multiple people over 50 years there were a lot of different ideas that were explored aesthetically over the years. We wanted to update things to bring forward contemporary engineering and aesthetics but we couldn't stray too far from the original designs due to a mix of copyright and nostalgia. Some product lines were all over the place however and those had to be worked into a more cohesive line.

Aesthetic Audit

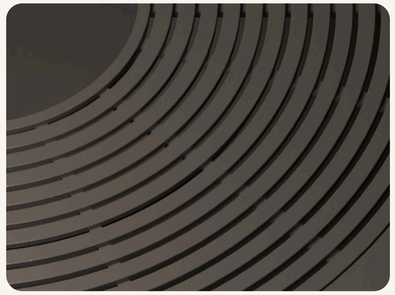
After reworking the thickness of our grate patterns, I started an aesthetic audit of our grates where I compared what was actually built vs what was shown in the drawings as well as looking at what grates had different aesthetic motifs throughout their size range. What I discovered was that there was about 25% of our drawings that didn't match the built grates aesthetically and 60% didn't match dimensionally. This meant it made more sense to just start from square one and redevelop the grates to achieve an ideal aesthetic instead of trying to match what already existed.

Designing For Chip and Grind

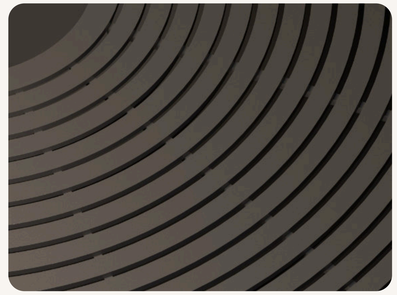
To minimize tool changes in chip and grind, I studied where they were and, more importantly, weren't happening. We had a few grates that had squared off inside corners in the pattern but the castings would always come out with rounded openings. What I found was that chip and grind were running the bit through the opening and just letting it carve out a rounded opening. While it was annoying that was happening, it also made a lot more sense from a production perspective and the rounded openings made more sense aesthetically. Moving forward, we'd remove those square openings and reduce the tool changes that would be required.



Thin rounded bars on the 60" 2 piece grate.
7/16" openings



Medium width, slightly rounded bars on the 60" 4 piece grate.
3/8" openings



Wide sharp bars on the 72" 4 piece grate.
1/4" openings

Some grates had varied wildly in aesthetics. These three examples are all from the same product line, the Flat Rainbow and feature 3 different bar sizes and opening sizes.

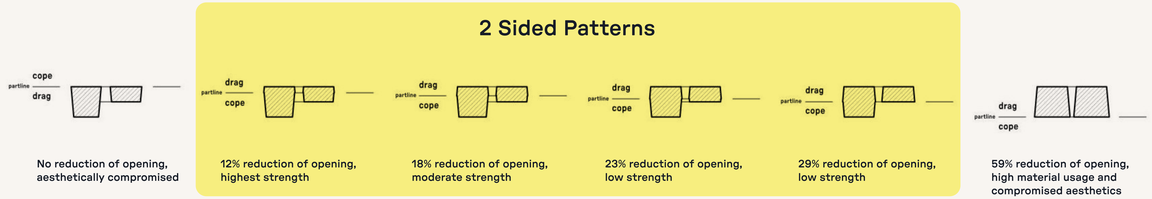


Squared off openings require additional attention during clean up vs rounded openings that match the bit size.

Refinement

Openings, Draft, and Partlines

All existing opening sizes on grates were made with ADA in mind. But over the years secondary requirements like “Heel proof” began popping up and many of our grates did not meet that spec. So through customer feedback I began updating the openings to meet that spec, where it made sense. At the same time I began looking at our draft angles and part lines to ensure that flow rate would be minimally affected by these narrower openings that met heel proof guidelines. Our sand system at the time allowed us to run steep draft angles and by adjusting our part lines I was able to maximize drainage and add strength to the grates.





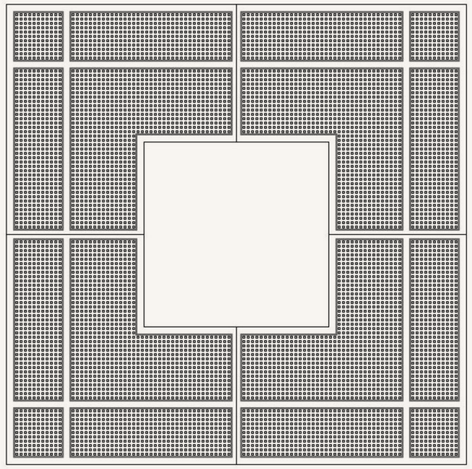
Example of flat back design

Grate Sizes

Cutting pavers on site sucks, and contractors want to avoid it as much as possible. While it isn’t possible to actually completely avoid it, we wanted to make it a little easier to deal with our grates. So I talked with contractors and audited pavers to see what size would make the install experience the easiest. I found that a true to size outside dimension would do that which would create a grate that was 5/8” smaller than the nominal size.

Material Waste and On Site Logistics

Tree grates can be stupidly heavy, making onsite logistics painful during install and for maintenance teams. With the weights of some of our grates, lifting a single panel could be up to 640lbs just to inspect a tree’s root ball. That doesn’t work for the one or two person team going out to do an inspection. It also made for a logistical nightmare just in our own production facility and in shipping. I worked on developing our grates to retain or increase their load capacity while shrinking material usage up to 35%.



120” Square Boston was our heaviest grate weighing 2,560lbs in iron



Section before pattern thinning: 640lbs per panel, 2,560lbs for full assembly



Section after pattern thinning: 415lbs per panel, 1,660lbs for full assembly

35% reduction in material while retaining required strength and no aesthetic changes. Still not light enough for easy lifting but a significant improvement

Outcome

75% Reduction in Frame Profiles Needed, 35% Cost Savings, Increased Price Stability

With the decrease in profiles that we needed to order we opened up the ability to stock materials. We began stocking 3-6 month supplies of our most frequently used angles which allowed us to have stronger buying power but also have stabilized pricing. Before, we were updating our pricing every 1-3 months. With the ability to stock material it meant that we could hold pricing for longer periods.

Better CX from Initial Quote to Post Install

By bringing cohesion to our grates we were able to better serve customers from initial contact all the way through to post install support. Consistent measurements, lighter grates, and cohesive aesthetics means that installs and maintenance are easier and allow clients to design with more flexibility.

Easier and More Cost Effective Manufacturing

Less material used in our castings and patterns means less raw materials used. It also means that the castings are easier to move around the shop floor and easier to ship. In addition to weight savings, new patterns saw time savings up to 80% in chip and grind which is our most labor intensive part of manufacturing leading to 10-25% savings in grates that have gone through redevelopment.

Increased Flow Rates

With the updated part lines we were able to increase average flow rate by 15% across tree grates. One tree grate style took a slight hit on their flow rates due to them originally being a flat back design but all others either kept the same flow rates or increased.

Thanks for taking a look at my portfolio

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