Find the BEST
way to get from…

UX Case Study:
A Mode Comparison
Transportation
Mobile App

By Lisa Ratner

ASSUMPTIONS
HYPOTHESIS
BIAS

I needed an app to motivate me to take the most sustainable transportation option.

Originally, I wanted to integrate a ghg (green house gas) calculator and fitness analysis into my transportation app to track my behavior.

This wasn't as important to the users I interviewed. Factors such as duration, mode, time, cost, and safety were more of a concern that didn't have an adequate solution.

PIVOTS

Often users didn't know the fastest options.

Purpose of my app transitioned to educate users about their mode options with an improved mode comparison interface, map overlays to orient themselves, and a navigation system that better integrates written directions with visuals.

Competitive Audits

UX Score Card Audit

App: Google Maps
Flow: Route Options / Mode Comparison
Interaction: Comparing and Selecting a Route
Score: B+

Mode priority
Assumes mode is priority. Shortest duration regardless of mode should be priority. B-

Address
Clarifies starting and destination addresses. A

Change Date / Time
Change departure time to plan ahead at a different time. A

Via Info
Confusing. It isn't enough info for the user to make a decision. Putting transit time is helpful but is ultimately too much information. Focus on the walking departure time is better. C+

Not real time data!
So almost completely irrelevant information when the bus reliability rating is 50%. D
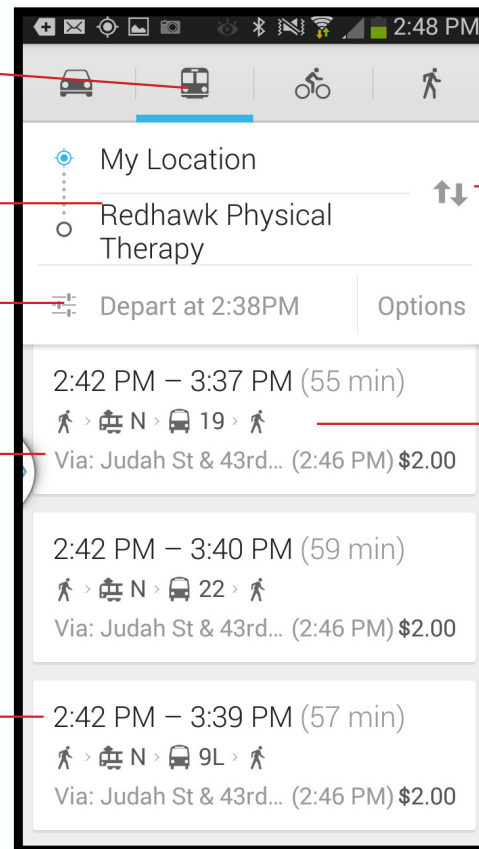
Easy Reverse button. A
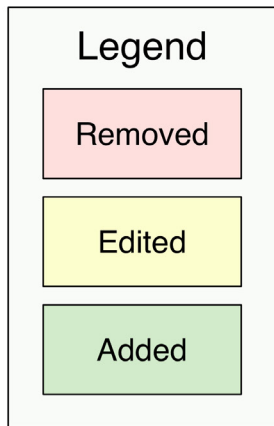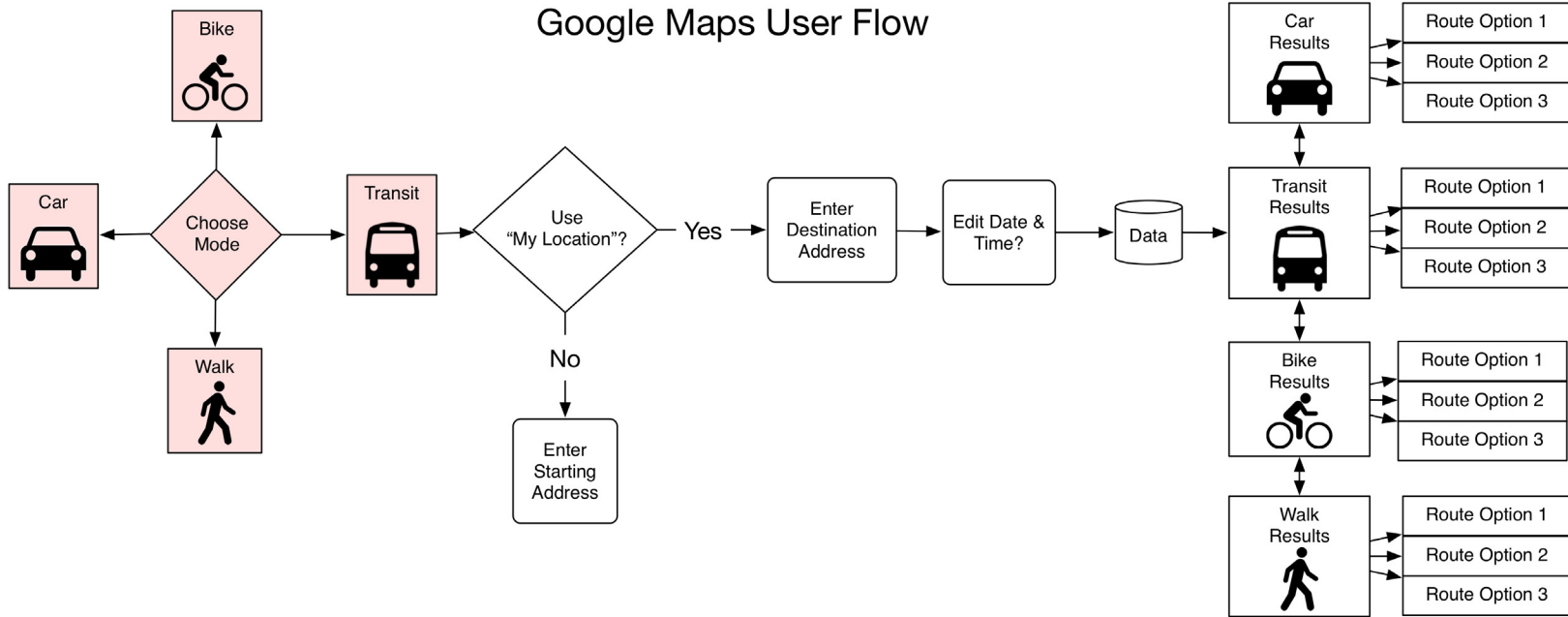
Route Info Display
Provides all necessary info. A

Defines the mode differences. A

Prioritizes arrival time as first piece of information and following information ordered correctly to user needs. A
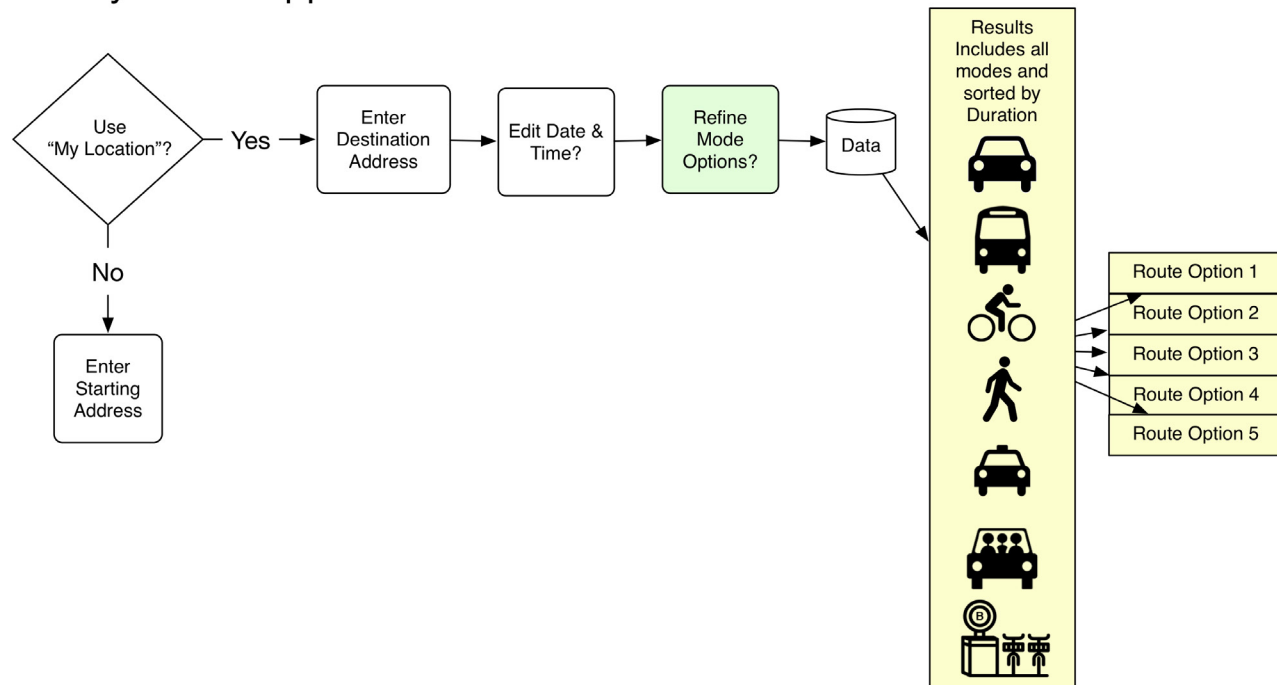
Map
Doesn't visually show the differences of these routes till next screen. C

2:48 PM

My Location

Redhawk Physical Therapy

Depart at 2:38PM   Options

2:42 PM − 3:37 PM (55 min)
🚶 › 🚉 N › 🚌 19 › 🚶
Via: Judah St & 43rd... (2:46 PM) $2.00

2:42 PM − 3:40 PM (59 min)
🚶 › 🚉 N › 🚌 22 › 🚶
Via: Judah St & 43rd... (2:46 PM) $2.00

2:42 PM − 3:39 PM (57 min)
🚶 › 🚉 N › 🚌 9L › 🚶
Via: Judah St & 43rd... (2:46 PM) $2.00

Google Maps User Flow

Bike

Car

Choose Mode

Transit

Walk

Use "My Location"? — Yes → Enter Destination Address → Edit Date & Time? → Data

No ↓

Enter Starting Address

Car Results
| Route Option 1 |
| Route Option 2 |
| Route Option 3 |

Transit Results
| Route Option 1 |
| Route Option 2 |
| Route Option 3 |

Bike Results
| Route Option 1 |
| Route Option 2 |
| Route Option 3 |

Walk Results
| Route Option 1 |
| Route Option 2 |
| Route Option 3 |

Legend

| Removed |
| Edited |
| Added |

My Transit App User Flow

Use "My Location"? — Yes → Enter Destination Address → Edit Date & Time? → Refine Mode Options? → Data

No ↓

Enter Starting Address

Results Includes all modes and sorted by Duration

| Route Option 1 |
| Route Option 2 |
| Route Option 3 |
| Route Option 4 |
| Route Option 5 |

UX Score Card Audit

App: Rover
Flow: Route Options
Interaction: Comparing and Selecting a Route
Score: B-

Address
Unclear if this is the starting or destination address. C

Public Transit Icon
Tells viewer which mode it is for. However the options include bus and train and the icon is for a bus. Also ALL of the options for this app are transit so it seems redundant. B-

Real Time Data
Very valuable info since Muni reliability rating is 50%. A

Spacing
Awkward space. Could be used to spread out arrival / departure times. D

"Select Route Option" Title
Good clear instructions and page name. However unsure it is needed. A-

Route Info Display
Provides all necessary info. A

Unsure if this right to left priority order best fits the user needs: cost, duration, arrival time, destination time, agency, bus / train name / number. C

Orders list by arrival time but that fact is hidden by it not being the most right aligned detail. B+

I would reorder to: Arrival / destination time, duration, bus number, cost.

Transit Agency
Doesn't differentiate between bus and train. C

Map
Doesn't visually show the differences of these routes till next screen. C

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543 Hugo Street

SELECT ROUTE OPTION
Public Transit

$2	18 min	10:46am 11:04am	MUNI 71
$2	23 min	10:51am 11:14am	MUNI 6
$2	19 min	10:58am 11:17am	MUNI 71
$2	18 min	11:07am 11:25am	MUNI 71
$2	18 min	11:18am 11:36am	MUNI 71
$2	19 min	11:23am 11:42am	MUNI N

Bing. © 2013 Nokia, © AND, © 2014 Microsoft Corporation
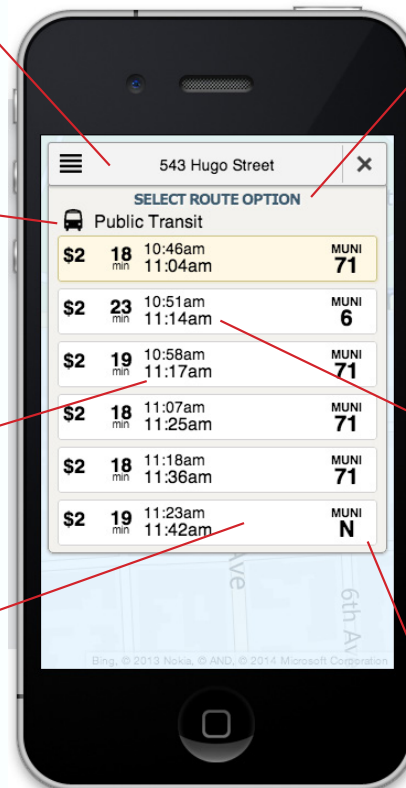
User Research

User Surveys

Your experience with your transportation apps!

Thanks for being willing to fill out my survey! I'm taking a user experience course and am studying how public transportation smartphone apps can be improved. I would love to hear about your experiences. This should take about 15 minutes.

* Required

How smartphone savvy are you?

1 2 3 4 5 6 7 8 9 10

what is a smartphone? ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ I make smartphone apps!

How transit savvy are you?

1 2 3 4 5 6 7 8 9 10

Not transit savvy ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ I've memorized many bus routes

Select all the modes of transportation you use each week

☐ My car
☐ Taxi
☐ Lyft / uber / sidecar / etc
☐ Car shares: zipcar / citycarshare
☐ Carpool with strangers
☐ Carpool with friends / family / colleagues
☐ Company shuttle: google bus etc
☐ Caltrain
☐ Ferry
☐ BART
☐ Muni Lightrail
☐ Muni Bus
☐ AC Transit
☐ Bike
☐ Walk
☐ Other:

How do you feel about your commute?

1 2 3 4 5 6 7 8 9 10

hate it! ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ love it!

30 responses

View all responses   Publish analytics

Summary

How transit savvy are you?
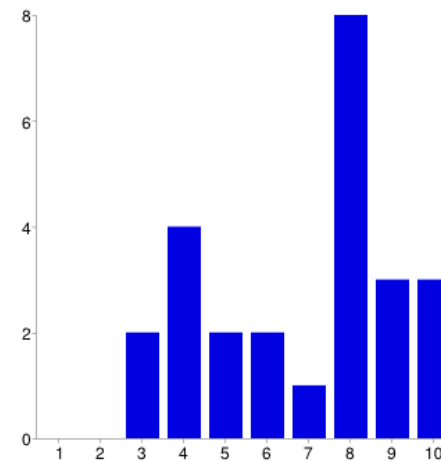
1	0	0%
2	0	0%
3	2	8%
4	4	16%
5	2	8%
6	2	8%
7	1	4%
8	8	32%
9	3	12%
10	3	12%

What mode do you use most often to get around?

Walk [4]
Carshare (zip [0]
Carpool [1]
Rideshare (ta [2]
Bike [6]
Car [4]
Public trans [11]
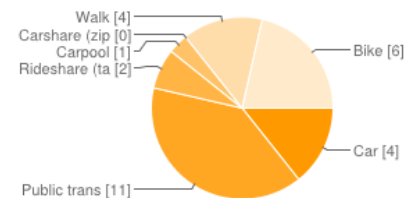
Car	4	14%
Public transit	11	39%
Rideshare (taxi, lyft, uber)	2	7%
Carpool	1	4%
Carshare (zipcar, city car share)	0	0%

Persona 1

Tracy the Transit Rider

"I'm a planner, so I prefer to have everything mapped out ahead of time. I haven't found any apps that can clearly give me a plan using **multiple transit systems** ahead of time (though Rover does address in-the-moment needs)."

Transit Savvy?

N ————————————————🚌———— Y

Smartphone Savvy?

N ——————————————📱—————— Y

Commute Satisfaction

:(—————————————😐——————— :)

Demographics

- College educated, late 20s
- San Francisco urban dweller
- Professional that works downtown

Transportation Mode Split in Miles per Week

- Public Transportation
- Carpooling with Friends
- Ridesharing with Lyft
- Biking
- Walking

Mobility Goals

- Reliable way to get to work
- Better real time data
- Better Communication

Favorite App Features

- Map / Route display
- Real-time departures/arrivals.
- Estimated trip duration.
- Comparing routes
- Social media delay notifications
- Comparing cost of transit to driving

User Scenario

- 8am checks real time app for all nearby buses that head downtown arriving to her stop before 8:30.
- Identifies that the 71 Bus is coming in 15 min
- Spends extra time getting ready / relaxing / buying coffee
- Walks two blocks to her bus stop, bus arrives on time.
- Knows route and duration since she takes it daily

Pain Points

"Better **communication** would be nice, so we know exactly what is happening and how long we will be waiting."

"When the bus doesn't come when it is supposed to, I end up waiting for it to come for 20 minutes during rush hour."

"Reliability. Knowledge of system wide delays. A more accurate read as to when the bus is arriving."

"Rush hour buses are so packed!"

"I also hate that two hours (8%) of my weekdays are in transit."

Interested in

- **Reliability analysis feature:** see how reliable your commute is compared to other modes
- **Cost analysis feature:** see how much you are spending per mile on your commute and compare alternatives
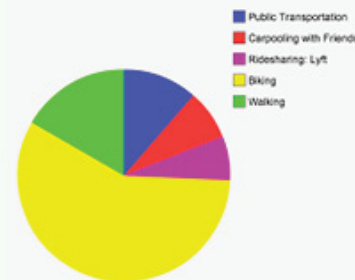
Persona 2

Demographics
- early 20s
- Berkeley urban dweller & professional

Transportation Mode Split in Miles per Week

- Public Transportation
- Carpooling with Friends
- Ridesharing with Lyft
- Driving alone
- Walking
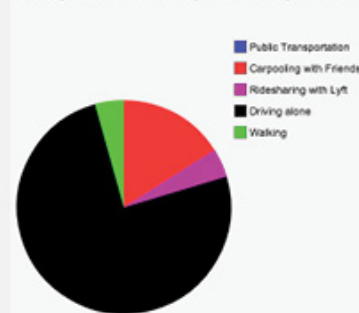
Mobility Goals
- Cost effective mobility. Dealing with gas, toll, parking
- Traffic alerts to know about delays
- Alternative routes that aren't zig zaggy

Favorite App Features
- Alternative routes
- Real-time traffic
- Estimated trip duration.
- Comparing routes

Dan the driver

"I have to drive all over the city, whether it is for my job or for meeting up with friends, or for running errands. I don't analyze the cost or other factors since alternatives don't seem like an option"

Transit Savvy?

N ———————————————— Y

Smartphone Savvy?

N ———————————————— Y
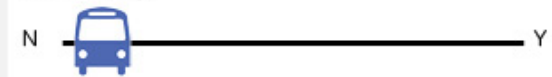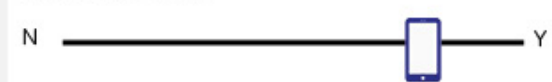
Commute Satisfaction

:(———————————————— :)
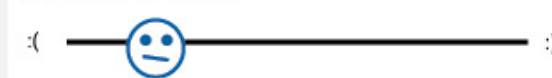
Pain Points
"Crappy traffic."

"I usually can't take the train because it doesn't get close enough to my destination. The **bikeshare** does not go where i need it."

"Most traffic problems are in the opposite direction. Rainy days, like today, mean traffic, pretty bad. I also hate paying the tolls."

"I think the main issue is of course, heavy traffic and high gas prices. I try to use Waze, but it often takes me on a crazy, zig-zaggy journey that is often more dangerous than it is efficient (i.e. I'm often directed to cross busy streets)."

"I've used public transportation a couple times, but it takes about an hour and a half each way (and I had to have someone pick me up on each side). I haven't biked in Los Angeles yet because I'm kind of afraid for my safety."

Interested in
- **Reliability analysis feature:** see how reliable your commute is compared to other modes
- **Cost analysis feature:** see how much you are spending per mile on your commute and compare alternatives

Persona 3

Betty the bicyclist

"I love riding my bike to work, to restaurants and bars to see my friends, and to run errands. I feel healthy and fit. I love the scenery and exploring different parts of town from the bike perspective. I feel energized and refreshed when I arrive to work."

Transit Savvy?

N ———————————————🚌——— Y

Smartphone Savvy?

N ———————————————📱——— Y

Commute Satisfaction

:(————————————————☺— :)

Demographics
- early 20s
- Oakland urban dweller & professional

Transportation Mode Split in Miles per Week

- Public Transportation
- Carpooling with Friends
- Ridesharing: Lyft
- Biking
- Walking

Mobility Goals
- Live a car-lite lifestyle
- Incorporate a workout into her commute to stay healthy and active
- Save money on transportation to spend on organic food at whole foods
- Reduce environmetal impact through transportation choices

Favorite App Features
- Bike route display on maps
- Estimated trip duration
- Cost comparison feature

Pain Points

"Speeding cars (as a cyclist especially) Distracted drivers (as a driver and a cyclist)"

"I haven't biked in Los Angeles yet because I'm kind of afraid for my safety."

"SF hills. Oakland hills. I hate hills. Everything feels so far away."

"When it rains I usually can't bike."

"Road conditions and lack of protected bike lanes."

Interested in
- **Reliability analysis feature**: see how reliable your commute is compared to other modes
- **Cost analysis feature**: see how much you are spending per mile on your commute and compare alternatives
- **Environmental impact feature**: see your greenhouse gas emissions impact and compares with alternatives
- **Safety analysis feature**: see how safe your mode of transportation is based on collision statistics

Other User Group Breakdowns:

Open to Alternative Modes vs. Value Familiarity

Transit Savvy vs. Not

Tech Savvy vs. Not

Frequent vs. Unique Destination

Sketches
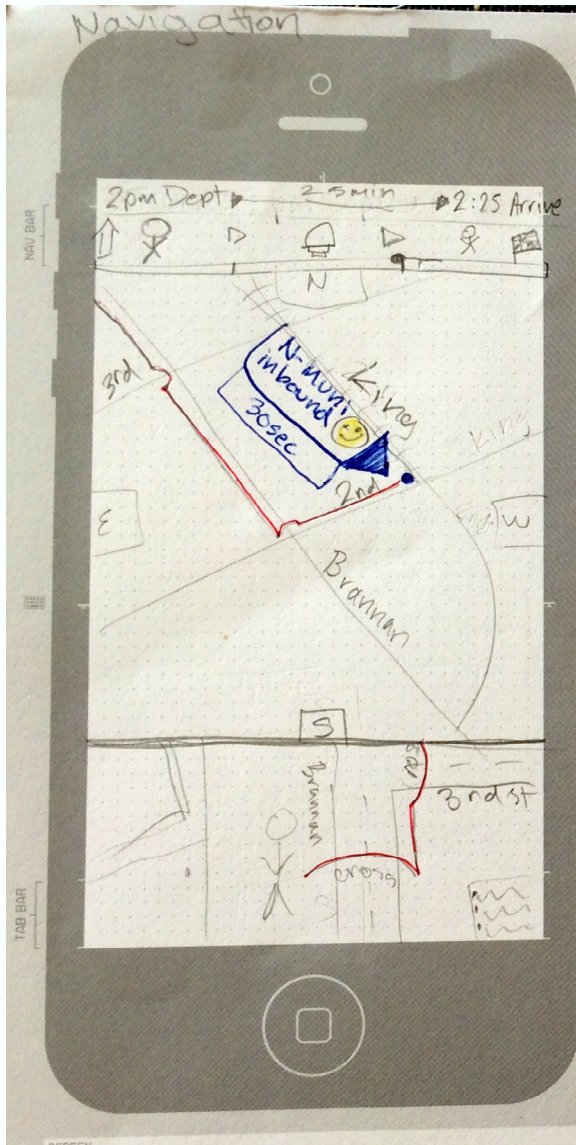
Navigation   Navigation Step 2   Mode Preferences: Car
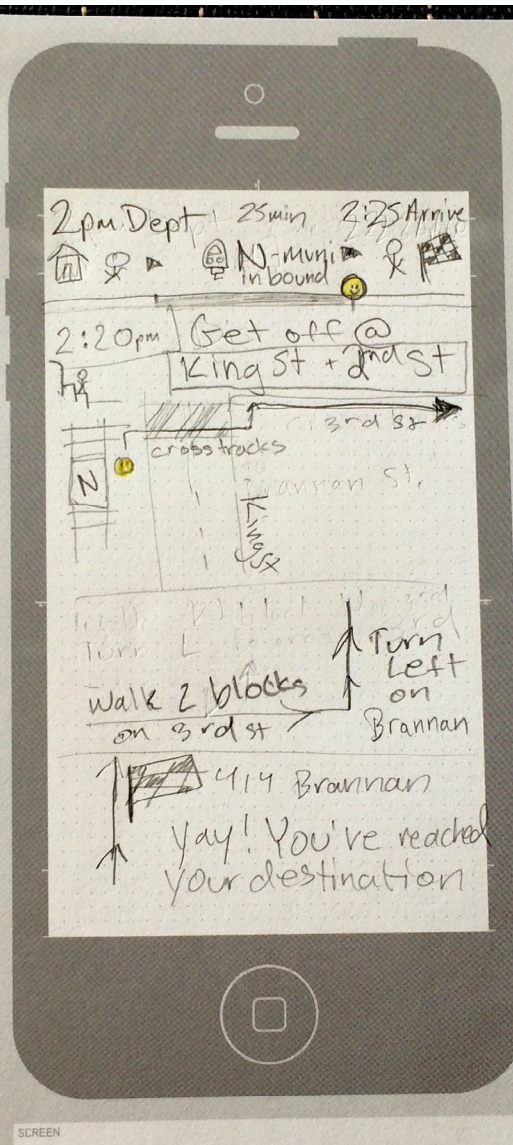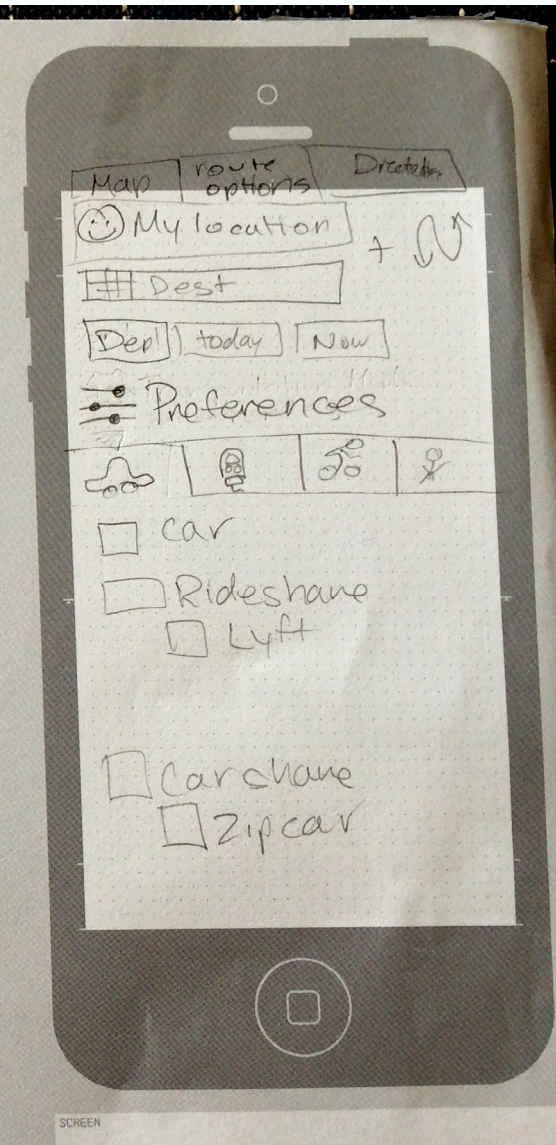
Sketches

Route Options   Starting Point Options   Mode Preferences: Car

Sketches
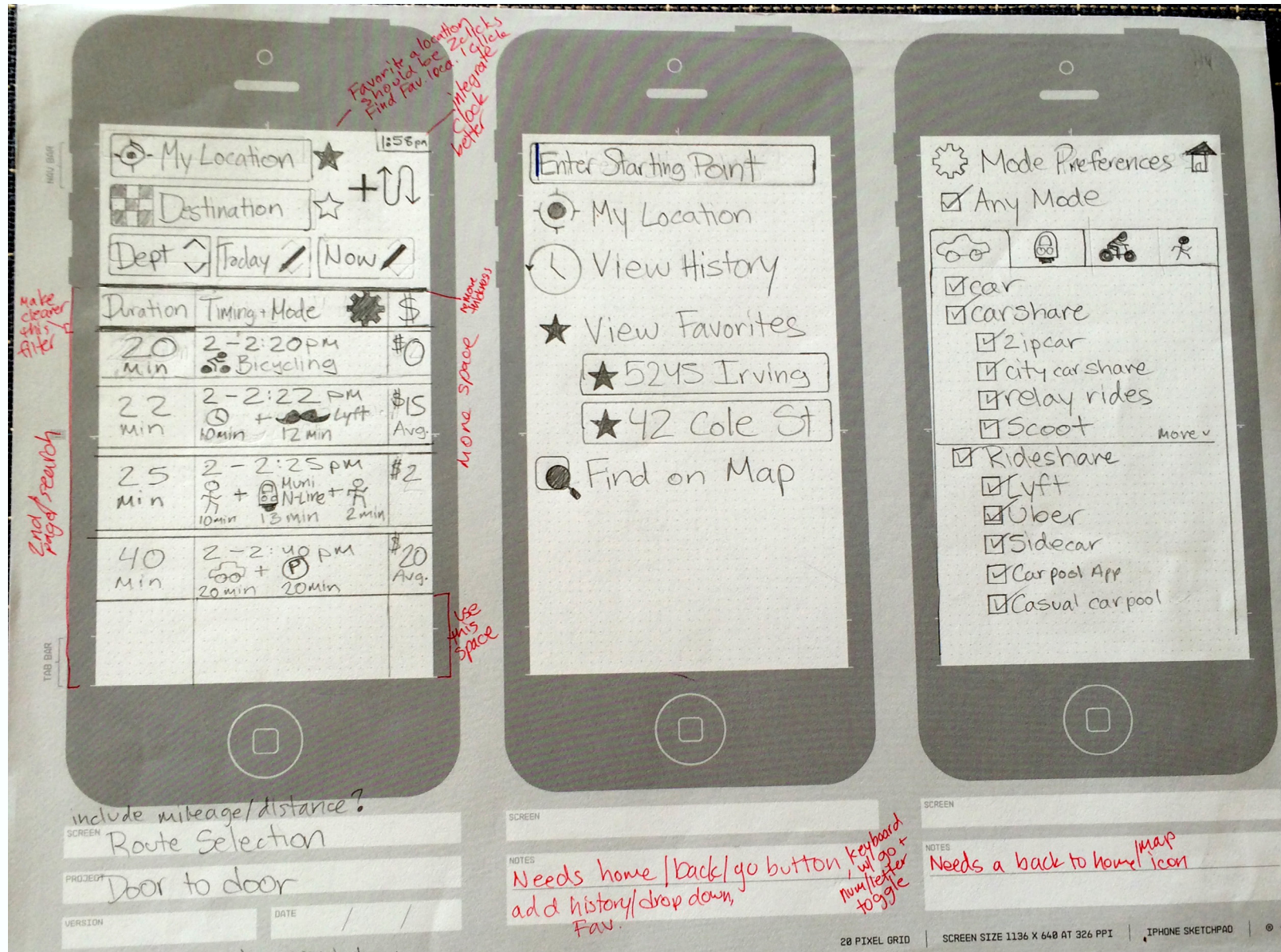
Map Overlays

Map Overlays 2
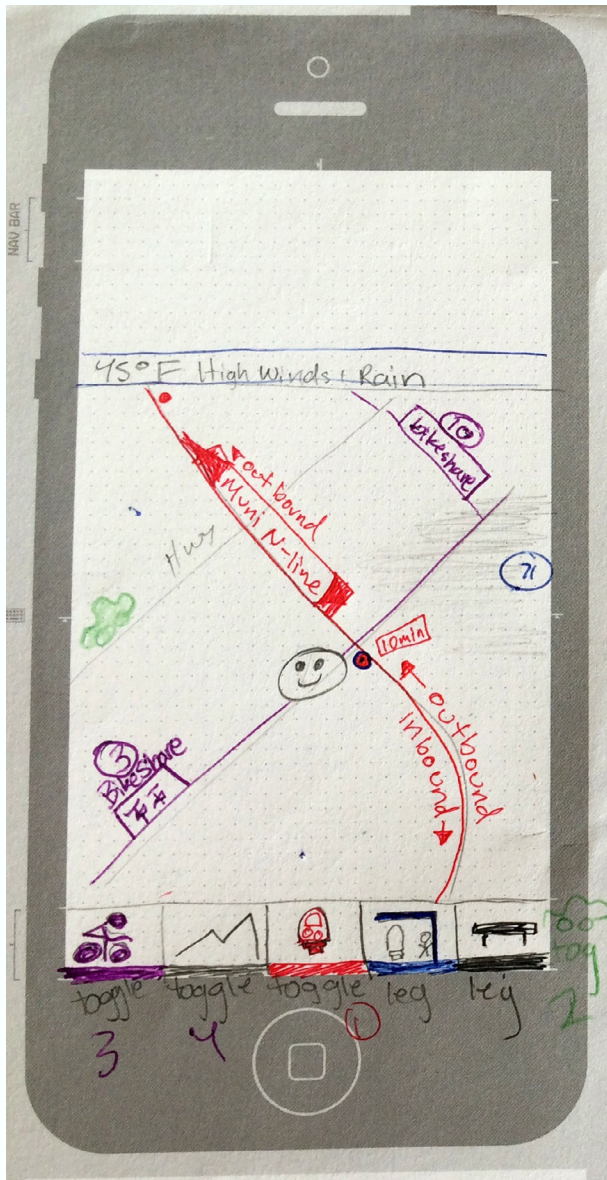
Route Options
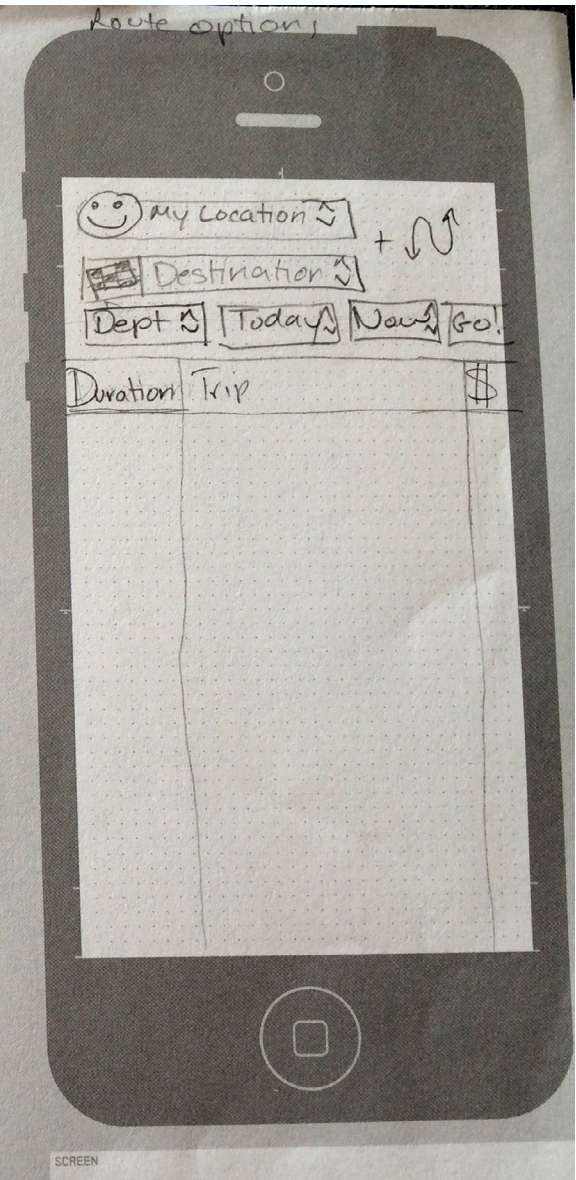
Sketches

Favorite Locations   Mode Preferences: Bike Mode Preferences: Walk
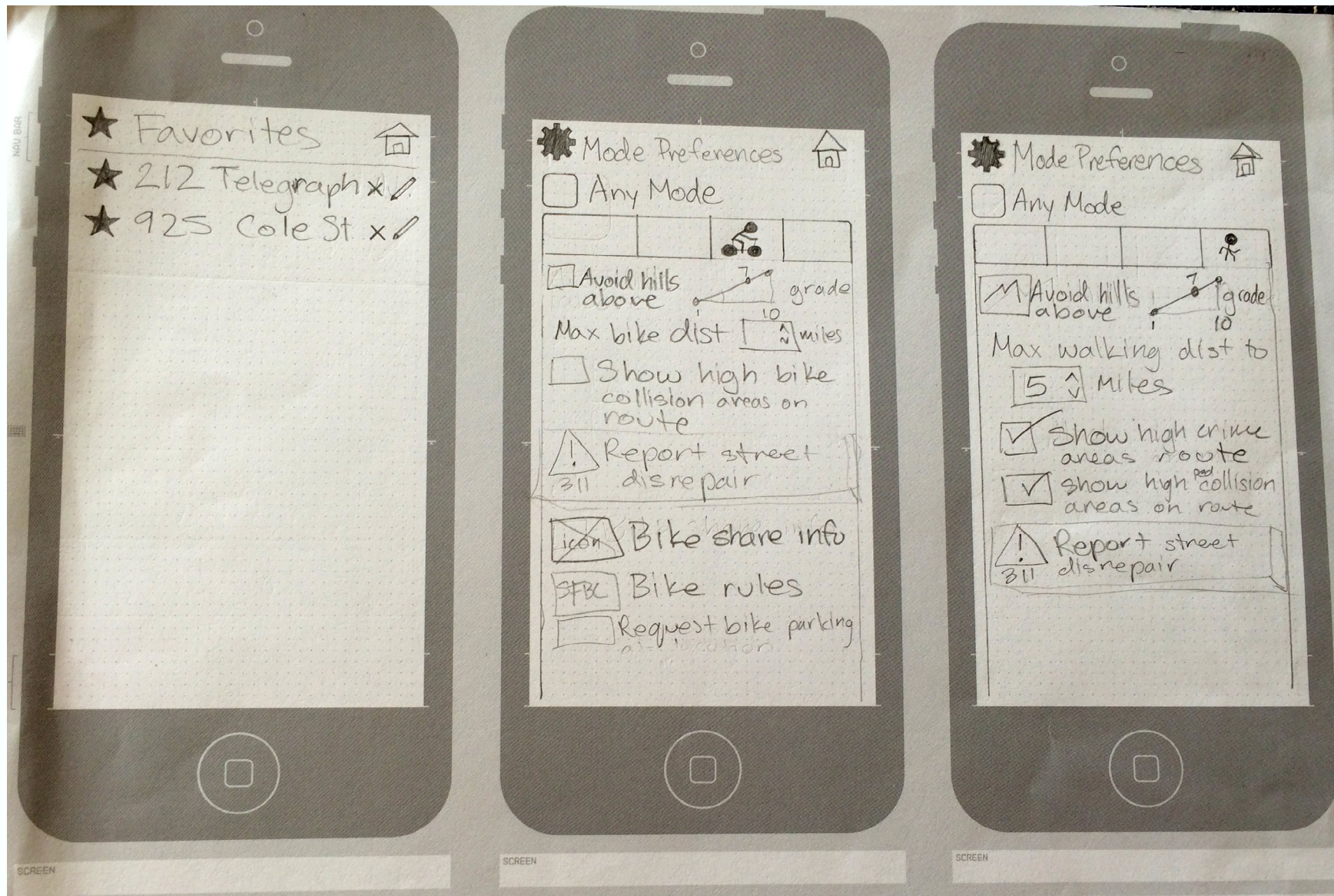
Sketches

Log In Screen   **Mode Preferences: Transit**   **Cost Breakdown**

Screen 1 — Log In Screen:
- To Save Favorites
- Log In
- Sign Up

Screen 2 — Mode Preferences:
- ☑ Any Mode
- ☑ Public Transit
  - ☑ Bus
  - ☑ Subway
  - ☑ Lightrail
  - ☑ Train
  - ☑ Ferry
  - ☑ Bikeshare
  - ☑ Shuttle

how looks like an arrow

Screen 3 — $ Cost:
- Mode: Lyft
- Total for route: $15
  - base fee: $3
  - $2 per mile: $12
- Comparison
  - Walking $0
  - Bicycling $0
  - Transit $2
  - Lyft $15
  - Driving + Parking $20
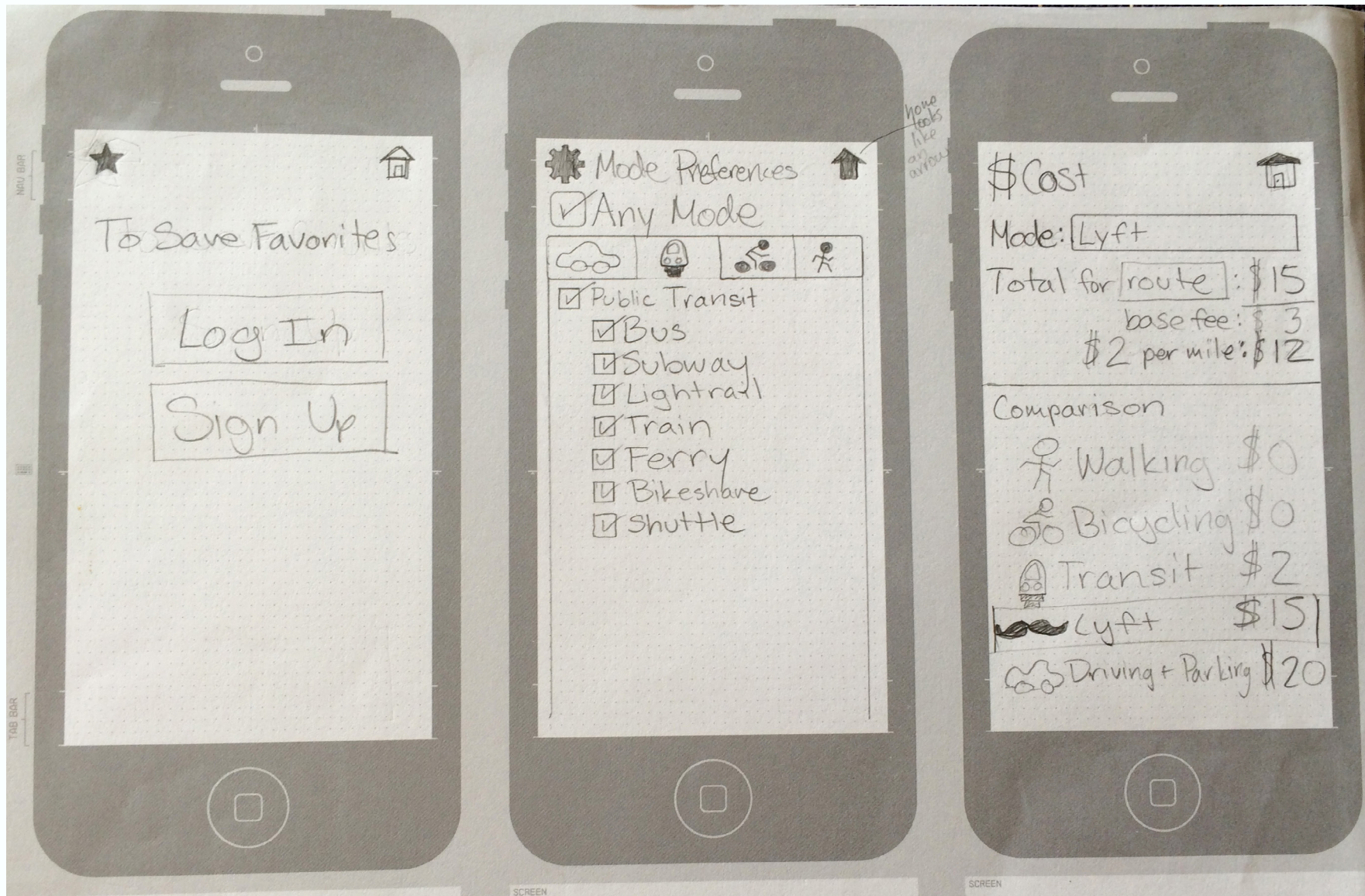
High Fidelity Wireframes with Annotations

Flow: Starting Location Assessment
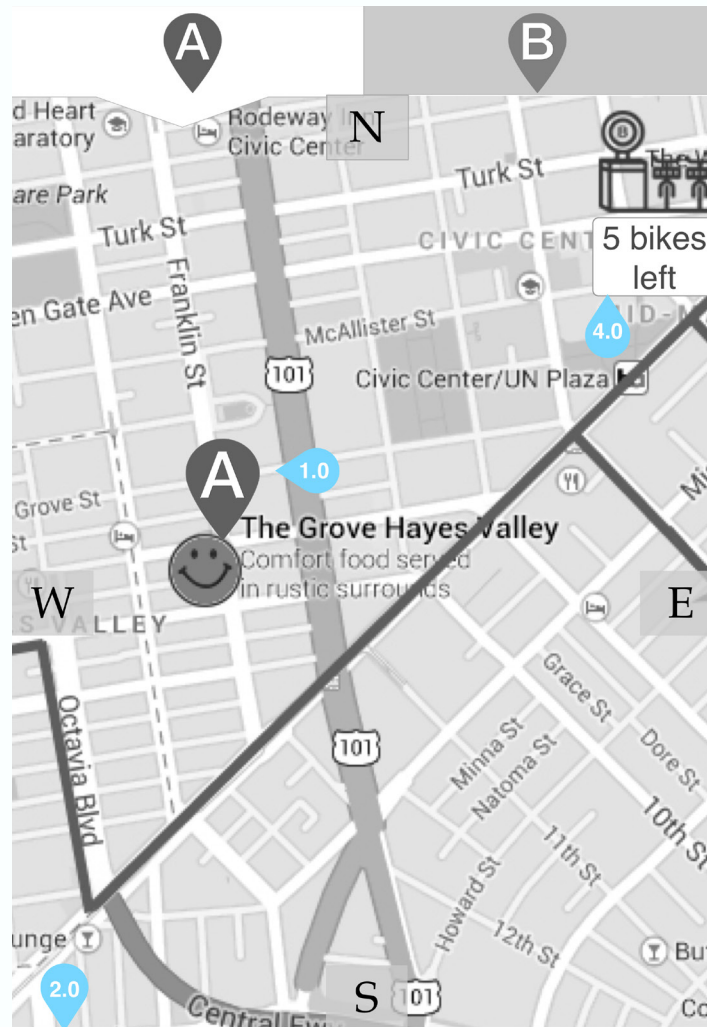
Interaction Annotations

1.0 — Change starting location

2.0 — Toggle to reveal / hide map overlays options

3.0 — View biking options

4.0 — This number is connected to Bike Share's database and changes as number of bikes become available

High Fidelity Wireframes with Annotations
Interaction: Mode Preference

Map Overlays	Route	Navigation	You

☺ Current Location ⌄

🏁 Destination ⌄

Depart by ⌄	📅 Today ⌄	🕐 Now ⌄

☑ All Modes 🚗 🚌 🚴 ♻️ ⌄ **1.0**

🚌	🚶	🚴	🚗

2.0 **3.0**

☑ 🚌 Public Transit

4.0

  ☑ 🚌 Bus ⓘ

  ☑ 🚆 Train ⓘ **5.0**

  ☑ 🚊 Subway ⓘ

  ☑ ⛴ Ferry ⓘ

☐ No Transfers **6.0**

☐ Senior /Youth Fare **7.0**
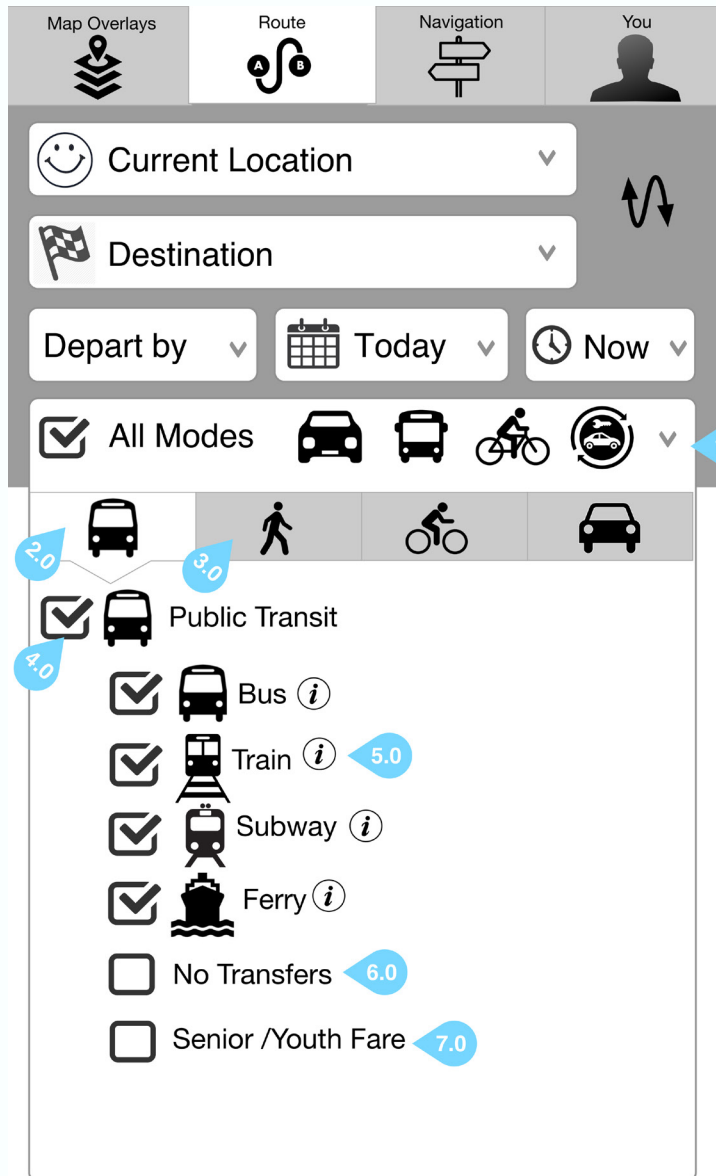
Interaction Annotations

1.0 Customize mode preferences

2.0 View public transportation options

3.0 View walking options

4.0 Select / Deselect all public transit modes

5.0 Get more information about the mode of transportation, links to agency website

6.0 Select / Deselect "No Transfers" so route options filter out transfer routes

7.0 Select / Deselect this fare option will recalculate estimated trip cost

High Fidelity Wireframes with Annotations

Flow: Editing Route Factors

Map	Routes	Directions

Current Location ⌄ 1.0 2.0

+ ↕

Destination ⌄ 3.0

Depart by ⇕ 📅Today ⇕ 🕐Now ⇕ Go! 4.0

8.0 9.0 10

Transportation Mode Preferences ⇕ 5.0

Duration	Trip	Cost	6.0
20 Min	2-2:20 pm 🚲 7.0	$0	
22 Min	2-2:22 pm 🧍 + 🚕 10 min 12 min	$15	
25 Min	2-2:25 pm 🚶 + 🚌 N Muni + 🚶 10 min 12 min 2 min	$2	
40 Min	2-2:40 pm 🚗 + 🅿 20 min 20 min	$20	

Interaction Annotations

1.0 Input field default is "Current Location". Drop down allows user to choose a different starting location.

2.0 Reverse starting and destination locations

3.0 Add an additional destination to the route

4.0 Go! sends the input data

5.0 User can deselect specific modes of transportation thus filtering out these modes from the results list

6.0 Toggle search results to be sorted by lowest cost

7.0 Select the route option row to enter navigation

8.0 Toggle between "Depart by" and "Arrive by"

9.0 Change trip day of the week

10 Change trip time

High Fidelity Wireframes with Annotations

Updated Interactions for Route Results Page
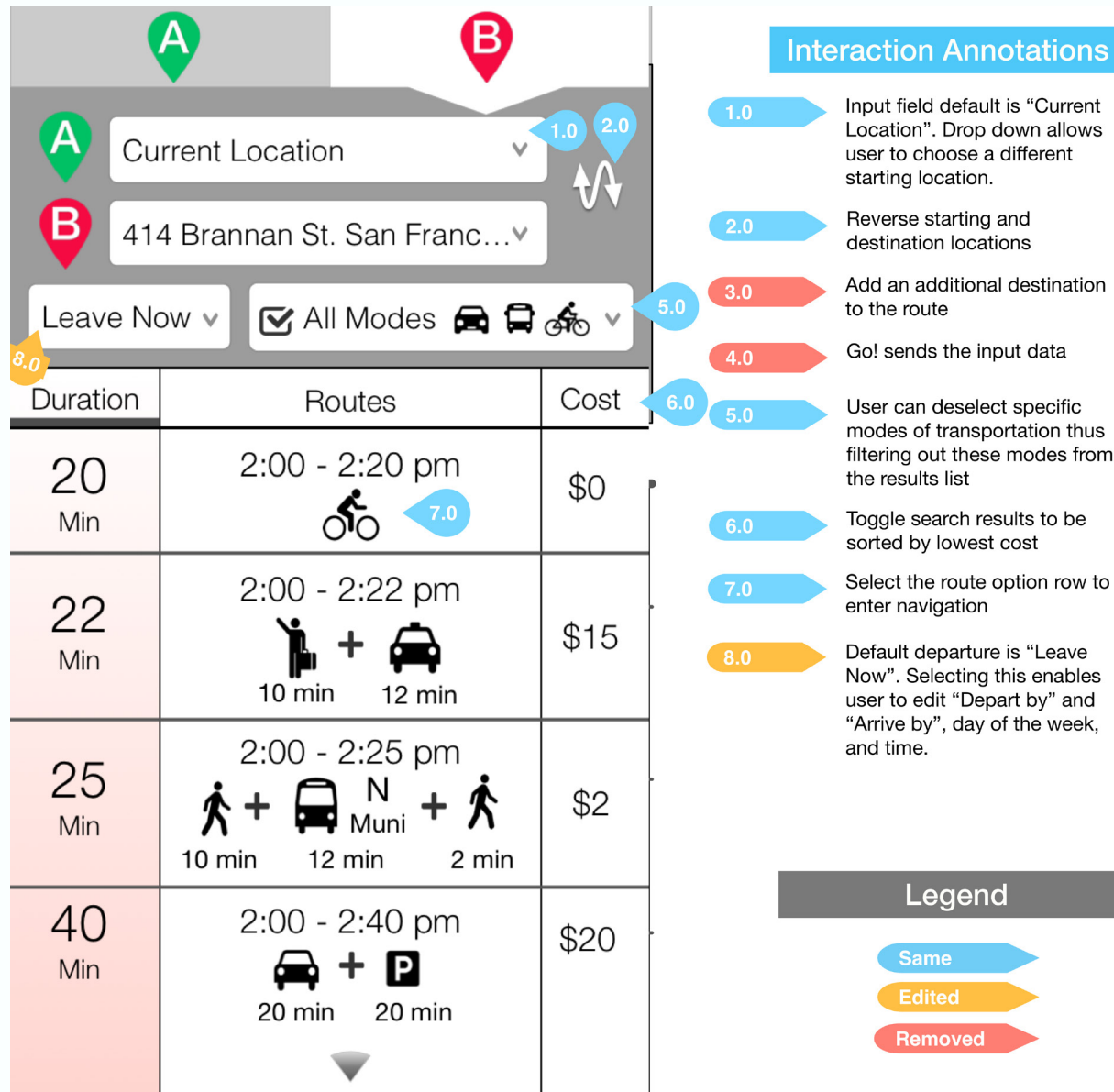
High Fidelity Wireframes with Annotations

Flow: Navigation
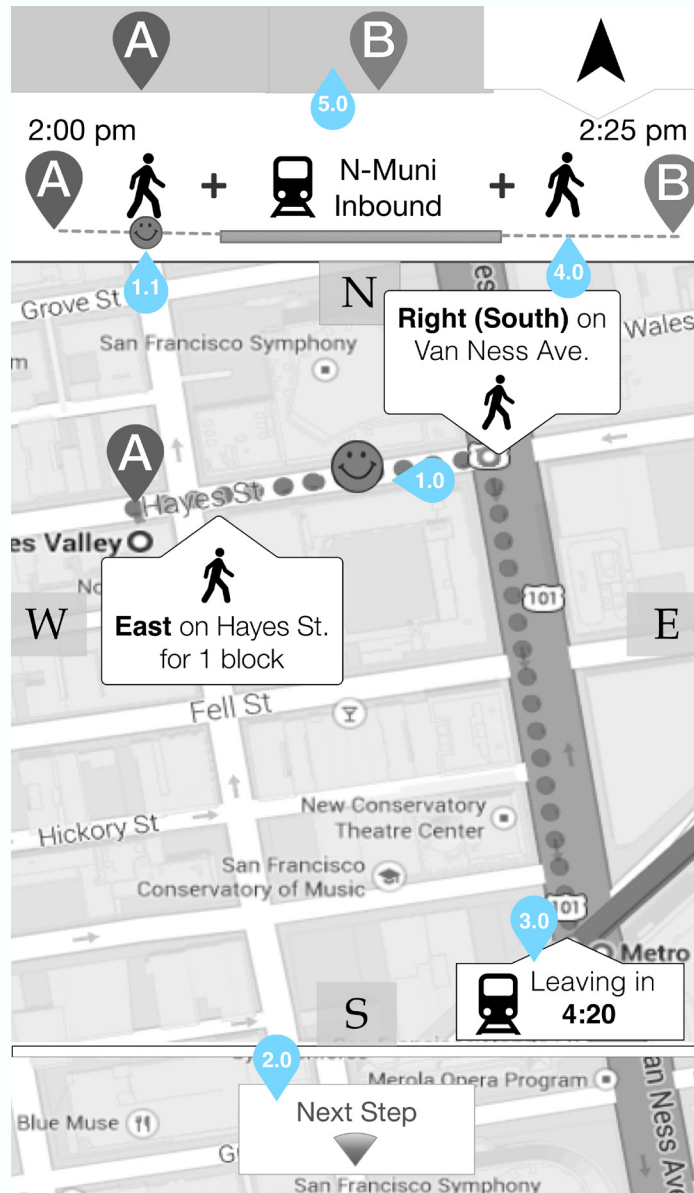
Interaction Annotations

1.0	Current location connected to GPS
1.1	Current location shows where user is in route journey
2.0	Scrolls down to next step
3.0	Real time countdown for train departure
4.0	Click on progress bar to view that direction
5.0	View route options and select different route if needed

Usability Testing

SAMPLE QUESTIONS

- How are the search results prioritized?
- How do you select one of these trip options?
- How do you add an additional destination to this route?
- How do you reverse the directions?
- How do you make it so bike options never show up in search results?
- What makes more sense "Instructions" or "Directions"?
- Is distance important to you or just timing?
- How do you submit your search query?
- How do you select an address from your favorites or history?
- What influences your route selection? Shortest duration? Or Mode type?
- Would you select a longer duration for a more familiar mode type?
- What do you think this button does? (point to trans-

Card Sorting

Search Elements

- Starting Location
- Select from Favorites
- Destination Location
- Select from History
- Add Additional Destination
- Edit Date / Time
- Map

Search Results Option Factors

- Duration
- Navigation
- Departure Time
- Arrival Time
- Mode
- Cost
- Distance (maybe)

User Preferences

- Public Transportation
  - bus
  - train
  - subway
  - ferry
  - bike share
  - Senior / Youth Fare
- Walk
- Bike
  - Bikeshare
- Driving
  - Taxi
  - Lyft
  - Uber
  - Carpool

FINDINGS

- Needs Submit / go button BEFORE mode preferences
- prefer current location over my location
- Icons unclear, bulleted list icon => indicated mode / times / iotions / list / contacts list /
- wants brand of rideshare indicated
- make sure math and compass directions are right
- explore other overlays: parking heatmap, amenities / tourist stuff overlays, gas stations
- use bus stop icon instead of dots
- + not intuitive for adding destination leg to route. add another stop
- define biking / walking grade levels
- collision info most important / bike rules least important
- rideshare / taxi service terminology issue
- cost toggle desired
- 2-:25pm => 2:00pm -> 2:25pm
- parking symbol unclear (not a verb, or action)
- change taxi logo / looks too much like a car
- use Arrows in addition to Right / Left
- "5 bikes left" instead of "5 bikes"

MOODBOARD
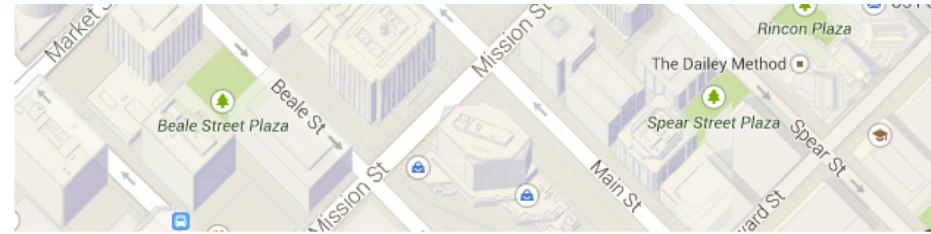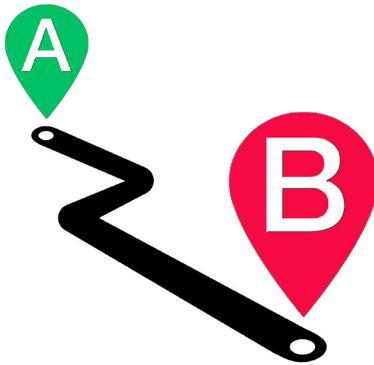
H1 Helvetica Neue Light (40px)
H2 Helvetica Neue Light (35px)
H3 Helvetica Neue Light (30px)
body (25px)

N
W · E
S
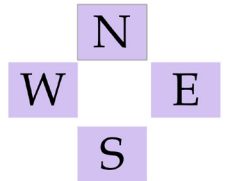
Ease
Reliability
Orienting
Speed

The Art of
Getting Around
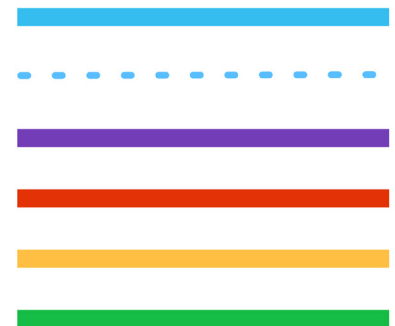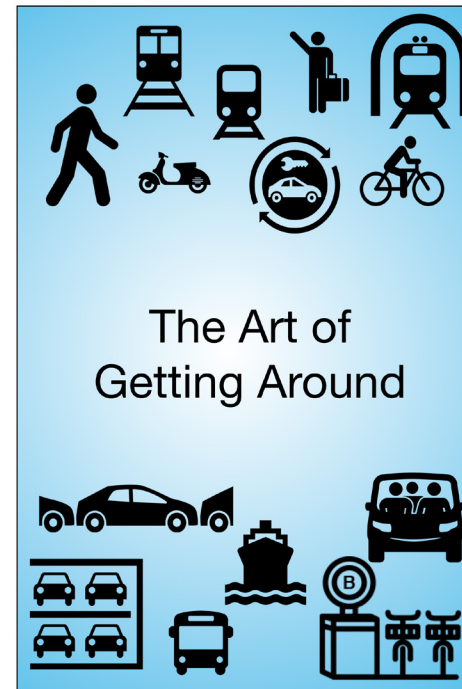
Usability Test
Initial Map Page
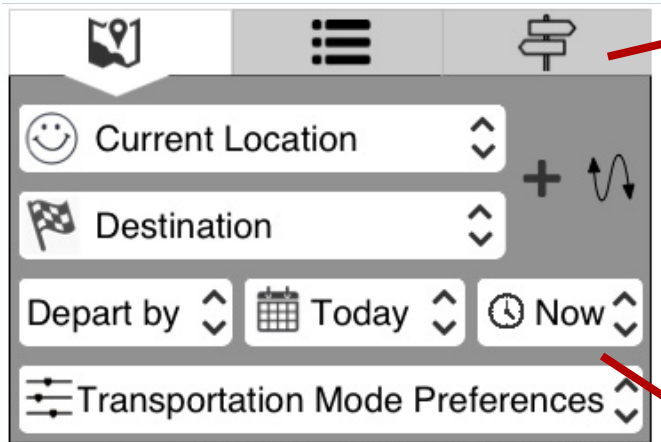
Problem
Icons not intuitive

Problem
Too many tasks per page

Problem
Map doesn't orient enough

Solution
Simplified nav menu conceptually

Solution
Tabbed destination task

Solution
Map overlays & compass
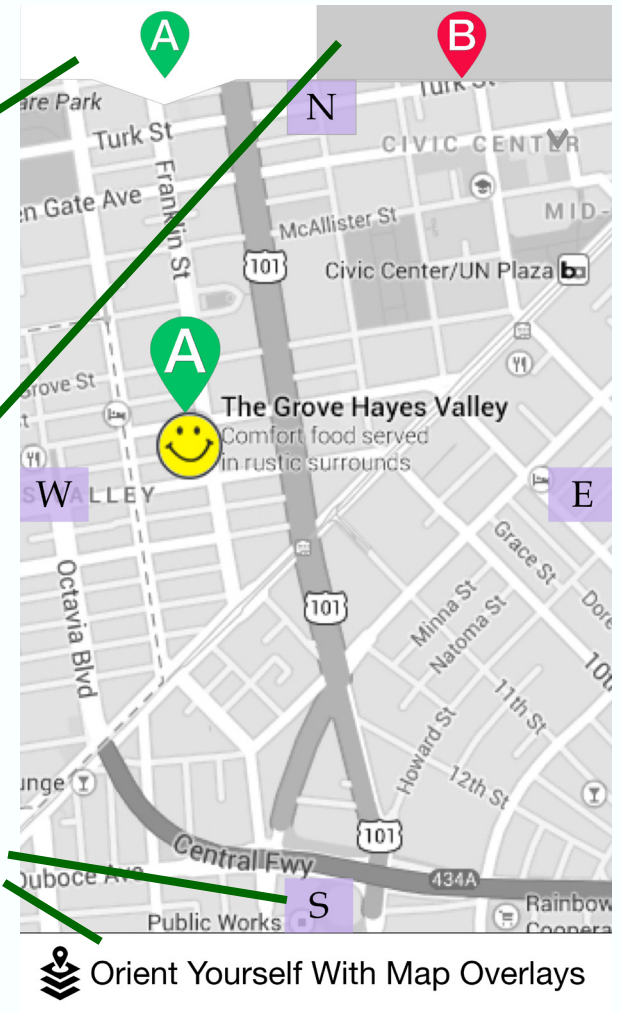
Usability Test

Route Comparison Page

Problem
Too many field inputs

Problem
Unclear that sorting by cost is an option

Problem
Routes difficult to decipher visually

Solution
Consolidated Dept/ Date/Time options

Solution
Added visual cue

Solution
Centered details

Left screen

Current Location

Destination

Depart by | Today | Now

Transportation Mode Preferences

Duration	Trip	Cost
20 Min	2-2:20 pm	$0
22 Min	2-2:22 pm 10 min 12 min	$15
25 Min	2-2:25 pm N Muni 10 min 12 min 2 min	$2
40 Min	2-2:40 pm 20 min 20 min	$20

Right screen

A Current Location

B 414 Brannan St. San Franc…

Leave Now | All Modes

Duration	Routes	Cost
20 Min	2:00 - 2:20 pm	$0
22 Min	2:00 - 2:22 pm 10 min 12 min	$15
25 Min	2:00 - 2:25 pm N Muni 10 min 12 min 2 min	$2
40 Min	2:00 - 2:40 pm 20 min 20 min	$20

Usability Test
Navigation Page
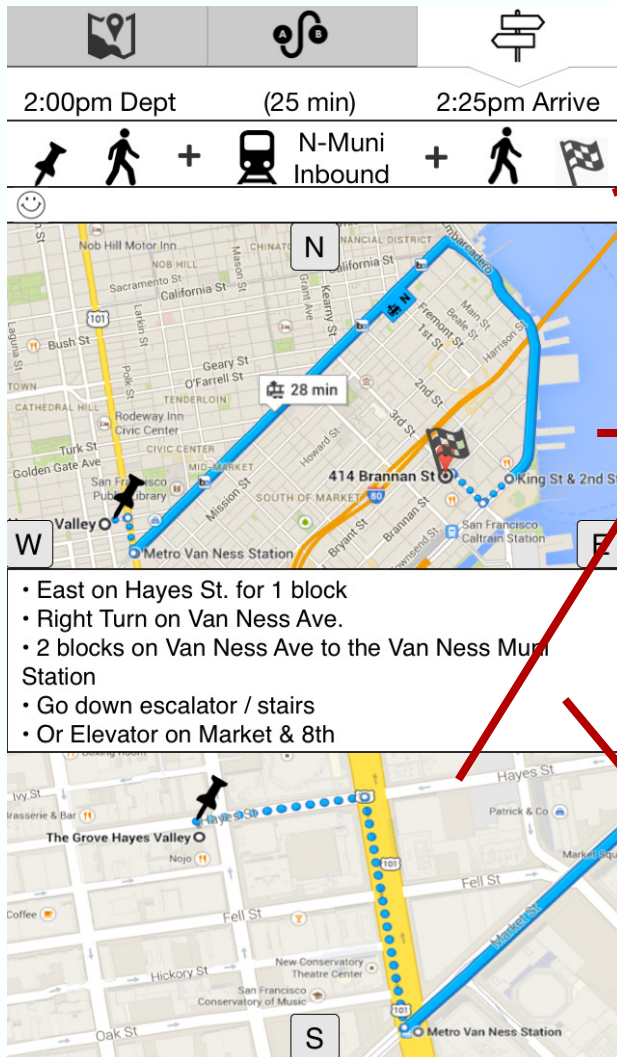
Problem
Progress bar not clear

Solution
Used better visual design cues

Problem
2 maps the same size make priority unclear

Solution
Enlarged overview map

Problem
Written text is separate from visual

Solution
Integrated text and visuals

Left screen details:

2:00pm Dept — (25 min) — 2:25pm Arrive

N-Muni Inbound

- East on Hayes St. for 1 block
- Right Turn on Van Ness Ave.
- 2 blocks on Van Ness Ave to the Van Ness Muni Station
- Go down escalator / stairs
- Or Elevator on Market & 8th

Right screen details:

2:00 pm — N-Muni Inbound — 2:25 pm

N Muni (Inbound)

Leaving in 4:49

Start

Clickable Prototype

https://www.flinto.com/p/5af69a67

Find the BEST
way to get from…

Interact

with Older Version High Fidelity Prototype:

https://www.flinto.com/p/ce93a222
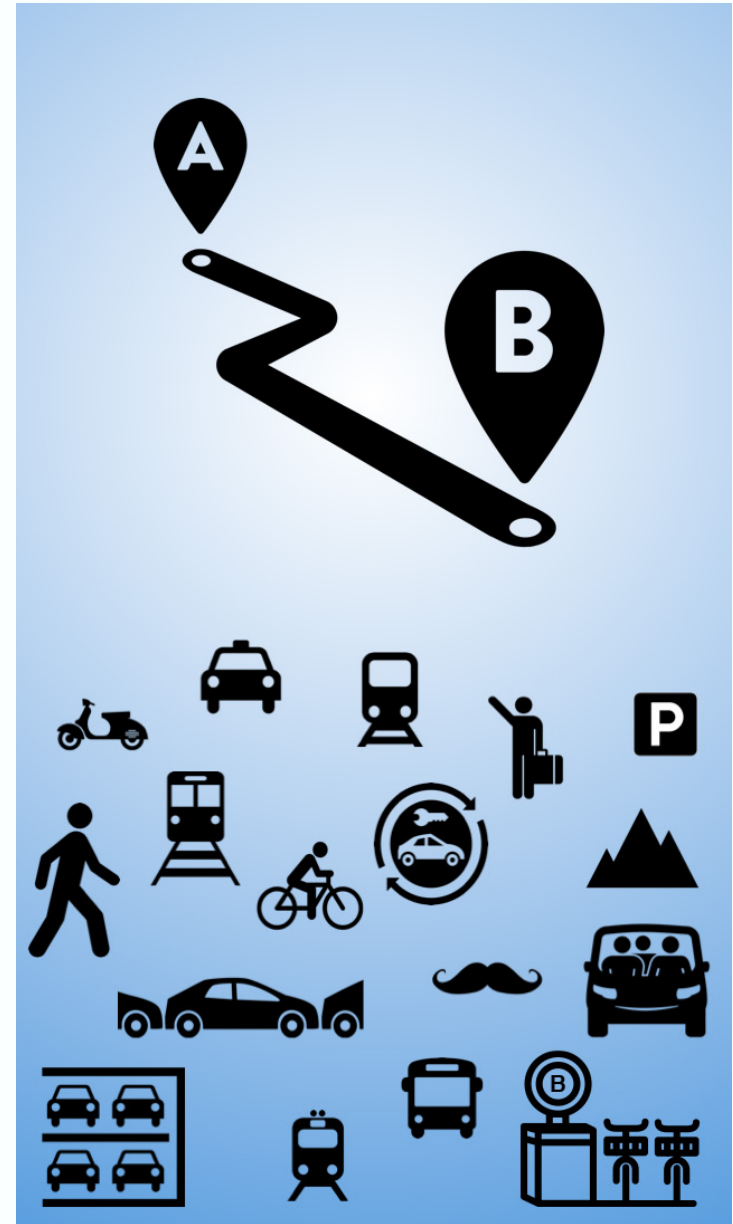
High Fidelity Prototype Screenshots

Interaction: Change Starting Location
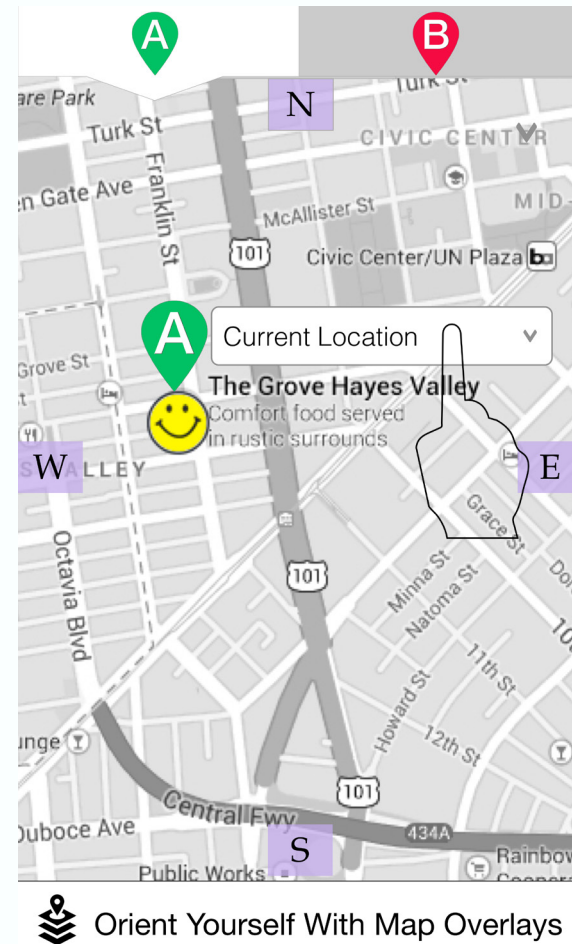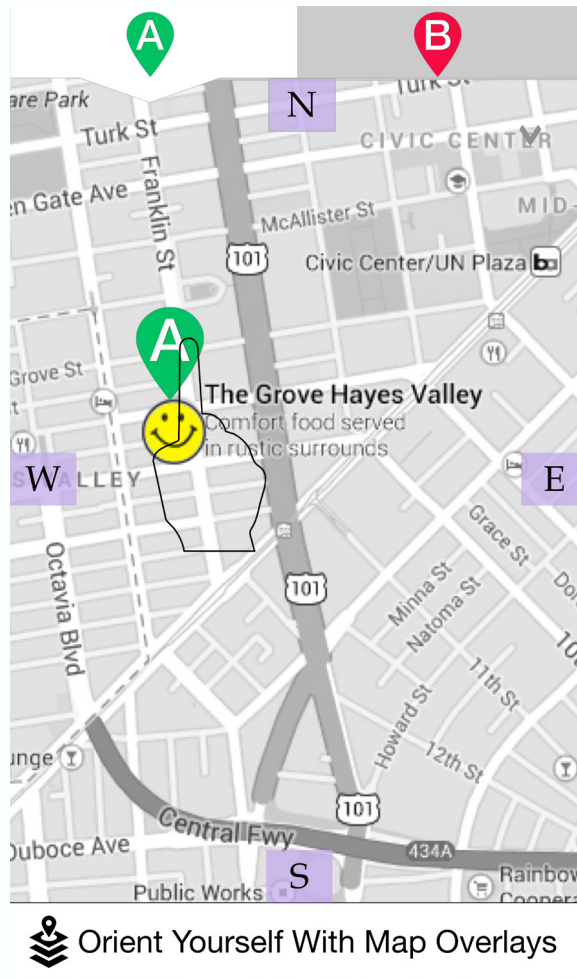
High Fidelity Prototype

Interaction: View Map Overlays
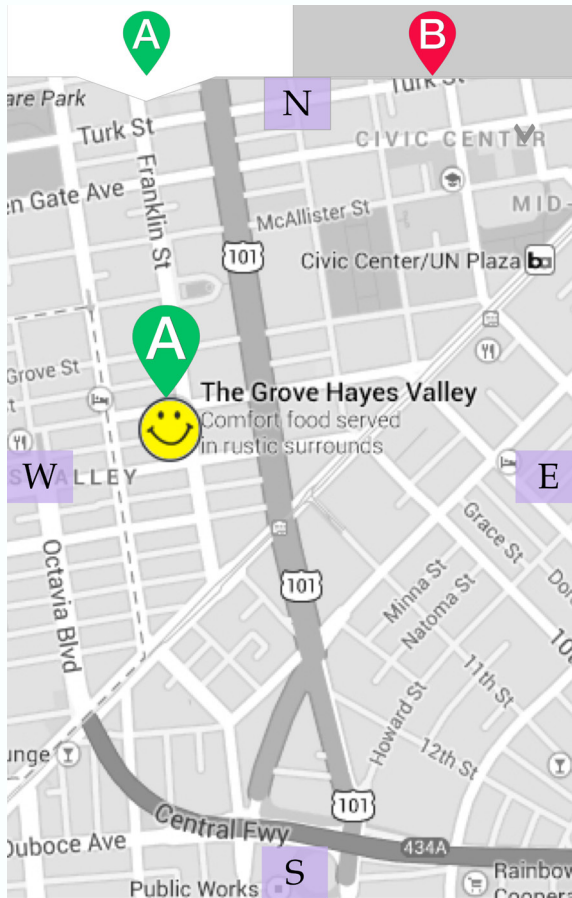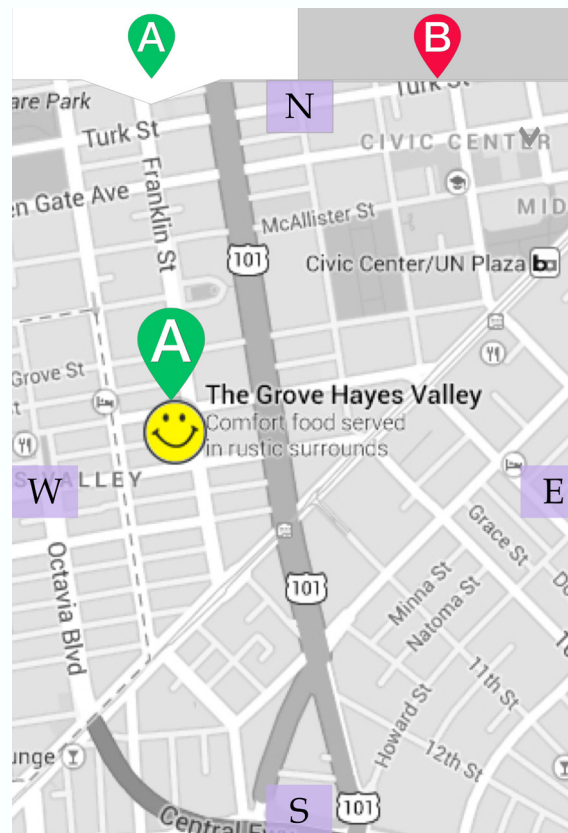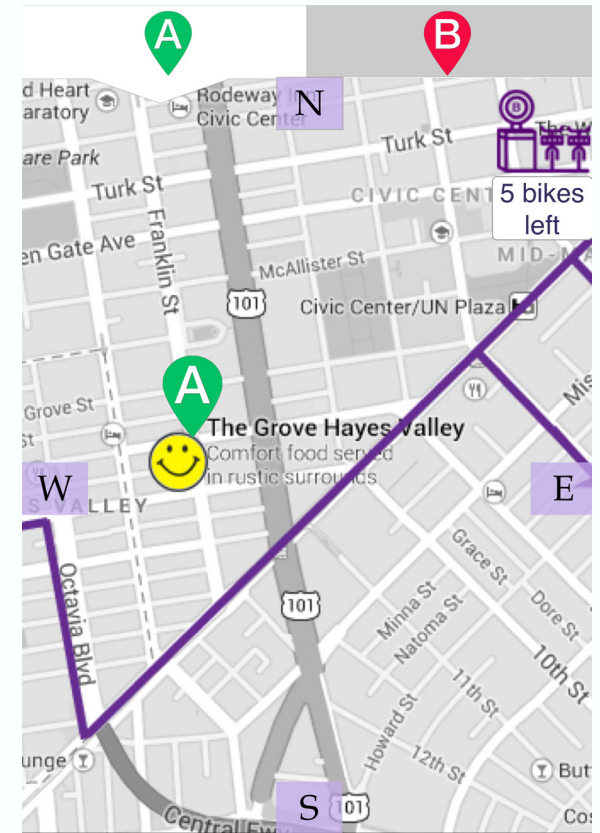
High Fidelity Prototype

Interaction: Customize Mode Options

Screen 1

A — Current Location

B — Destination

Leave Now ⌄   ☑ All Modes 🚗 🚌 🚲 ⌄

Screen 2

A — Current Location

B — Destination

Leave Now ⌄   ☑ All Modes 🚌 🚌 🚲 ⌄

🚌 | 🚶 | 🚲 | 🚗

☑ 🚌 Public Transit

   ☑ 🚌 Bus ⓘ

   ☑ 🚆 Train ⓘ

   ☑ 🚈 Subway ⓘ

   ☑ ⛴ Ferry ⓘ

☐ No Transfers

☐ Senior /Youth Fare

Screen 3

A — Current Location

B — Destination

Leave Now ⌄   ☑ All Modes 🚗 🚌 🚲 ⌄

🚌 | 🚶 | 🚲 | 🚗

☐ Avoid Hills Above   [grade triangle]   Grade ⓘ

    1   ▲7   10

☐ Max walking distance to   [5 ⌄] Miles

☑ Show high crime areas on route   ⓘ

☑ Avoid high pedestrian collision streets   ⓘ

311 Report Sidewalk and Crossing Issues

High Fidelity Prototype
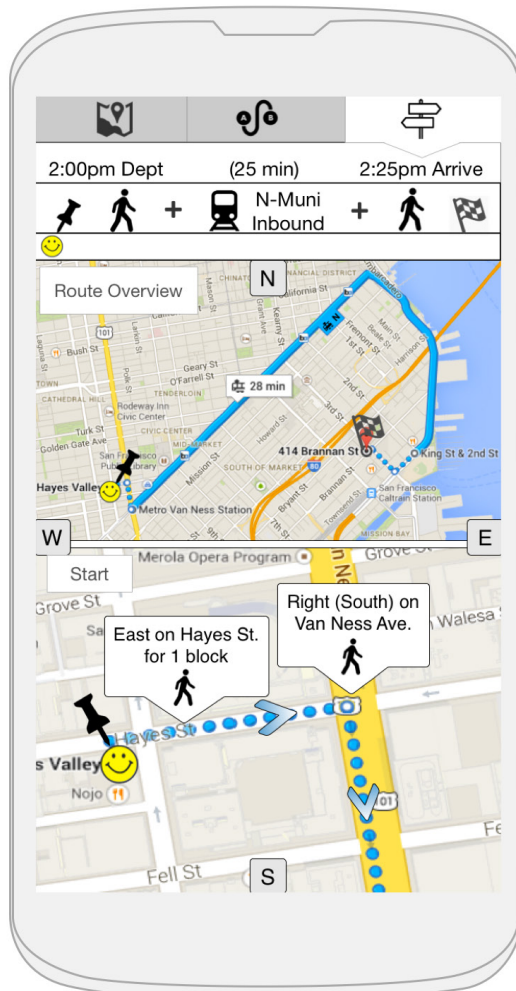
Interaction: Sort Results by Cost

High Fidelity Prototype
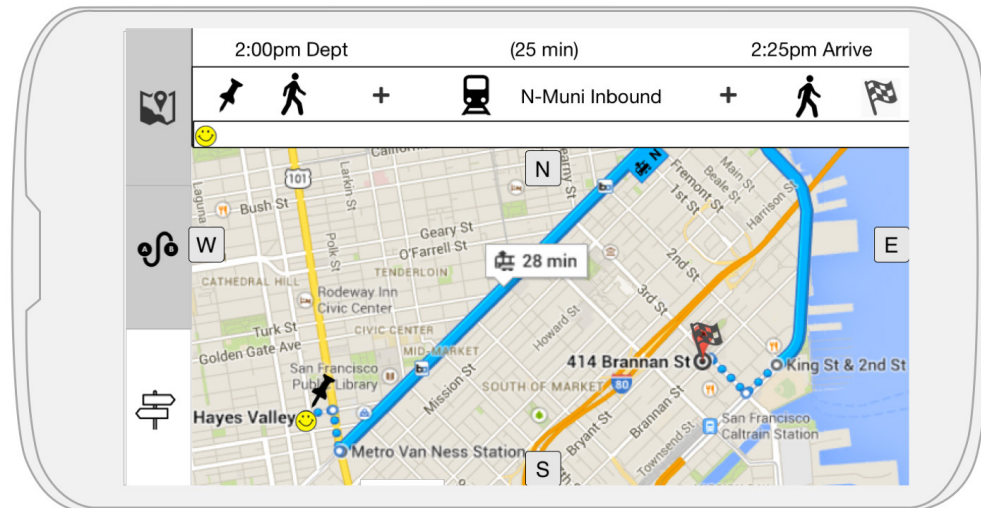
Flow: Navigation
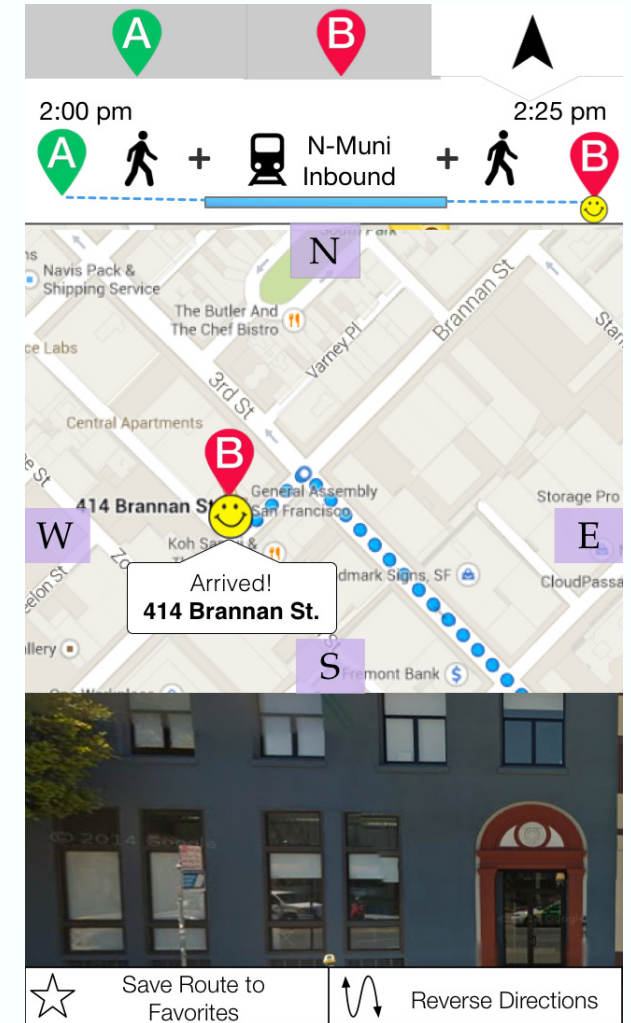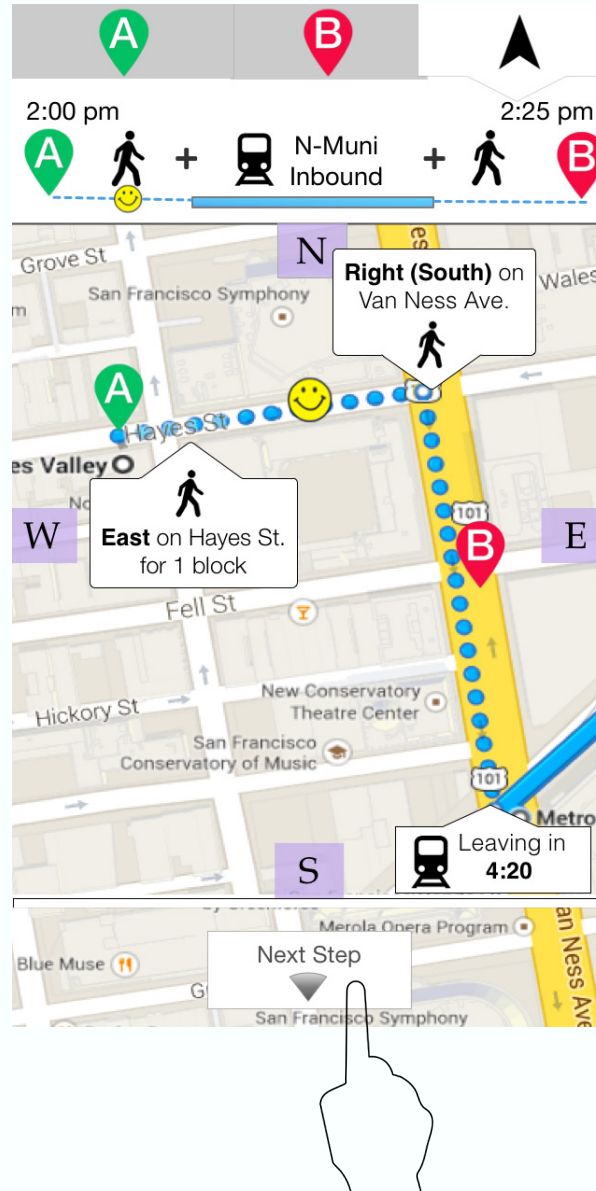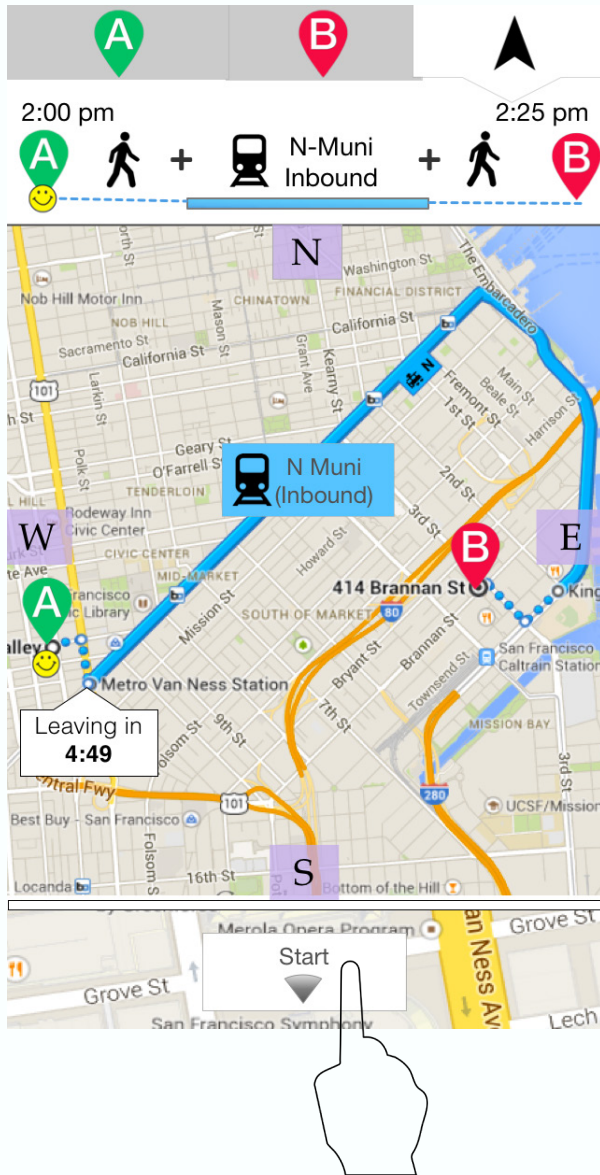
Adaptive Layouts

Portrait

Landscape

Next Steps

- Dive into visual design. Define colors, typography, and icon style.

- Use analytics to measure which features are used most often.

- Optimize the interface design with new user test findings.