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Optimus Ride (supplier)

Note: Optimus Ride spun out of the Massachusetts Institute of Technology in 2015 and focused on creating technology to run energy-efficient, self-driving vehicles. It shut down its operations in January 2022 and sent a majority of its engineering team to Magna International, a Canadian maker of car mobility technology, as part of an acquisition.
Stakeholder- Optimus Ride (supplier)

Especially highly focused on safety, not to be too long winded about my personal philosophies. But I also have a very strong personal philosophy that I think to actually make system requirements, you actually have to understand the system, not just the problem. And so one of the things that drove me off to this ride was that I was employee 22. So I could still get my hands dirty, they were very early on, I had done a lot of integration style work at Draper, even working on the demo, just because I am a very hands on person. And through that experience, I learned that making the system requirements are not obvious at all. Like I said, if they were it would be easy. So I realized that this domain expertise had to be built up because roboticists aren't interested in system engineering.
Like people who are making you know, ml algorithms and such don't really care that much. So, a big push of my team, which is something I learned at Honda was, like, be the expert in your area, or expert quotes, right? Because I don't think we can be experts, we'd have to go get PhDs, but um, be the expert, you know, so learn a lot about whatever you're working on. That's that part of the autonomy stack. I mean, you can't be everything, but you can learn a lot. And that will sort of fill in for that lack of domain expertise. So quite honestly, the best way to do it right now is to be involved on the sort of back end of the Wii. So either if you're not developing it, you should be testing it. Right, essentially. So we've been trying to build a process where, and I won't say that, like, I went there to build a process. But that's part of being a director. How do I sort of incorporate what we learned from our field testing and all the other types of testing we do? How does that actually drive the requirements? And like, what are the forms these requirements take ?
It's easy to say, follow the standard and come up with these things. And this will be safe in that. But it's, it's actually not that obvious, especially when you're dealing with some of these blackbox components. But even if we were, even if we took machine learning out of this whole scheme, I would argue that even motion planning algorithms, the ones these guys want to use are probabilistic in nature. And most of the things about how you would write those requirements actually don't make a lot of sense. A lot of people who work on other types of autonomy will argue with me, and I'll say, Well, that's because your problem is such a simplified, constrained space that you can get away with that argument. But unfortunately, we can only use that argument part of the time and not the whole time. So anyway, I've been pushing. So like, for example, when I went back to Draper, Draper is still really close to MIT. And after spending about a year working on self driving cars, I said, holy crap, I don't know anything about these algorithms. I actually went back and took another graduate course and one of the robotics ones, because I was like, I don't even know about half this stuff, right? Like, people

were asking me questions, like, I don't know, how does that work? I mean, of course, I can read, but I'm lazy. And I like to sit in class. So it was across the street, it was very easy.
So I sort of stressed that on my guys, like, okay, you don't, you're not going to write the code, or you're not going to design the algorithm, but you should understand how it works. And when you go test it, you should drive those requirements back into the overall design process. With this sort of overarching, you know, is it a safe sort of driving, but I'm sorry, that was a little long winded, but that's kind of so I've been trying to foster that process about philosophy through my group.
I should probably go get an easier job, though. I say that out loud. But anyway, that's basically what it is, like, day to day is me trying to like, you know, learn more about that. No, no, let's do this, or oh, yeah, let's take this approach now. Because that's more that's, that seems more reasonable for where we're at, and those sort of things. So in a lot of planning, a lot of planning all the time.

Interviewer

3:55

So that's great. Thanks for all the detail on that. More broadly, I guess if, you know, In a similar vein to figuring out all the system requirements and defining those, what do you guys consider more broadly as the problem that optimus ride is trying to solve?

Interviewee- Optimus Ride (supplier)

4:13

Optimus ride is actually trying to create, excuse me, a mode of transportation and a sort of part of the transportation system that addresses the sort of urban mobility. First, the last mile sort of solution, which goes along with like, where we think a V's will fit in well, right now, and it's sort of like constrained environments where like, maybe having a bunch of buses running around doesn't make a lot of sense, there isn't a subway stop or even a bus stop, but like, getting that last piece is very difficult, right? And so where the sort of low speed shuttles will fit in very well. That's sort of the part of the transportation system we're trying to solve that is trying to supplement I guess you would say is like that aspect.
The notes were mainly focused on, which is one of the reasons why we think of autonomy again, like, you could argue that autonomy is not necessary to solve that problem. But I think what they, the co founders, had realized was that having autonomy really makes it an actual solution, right? As opposed to like, oh, let's have a bunch of people run around in those bicycles with a bunch of people in the back, well, yeah, that's not really going to scale well, or let's have a bunch of Uber drivers, well, that doesn't help because it just adds congestion and like, screws up the city and these little areas even more where they don't want people driving around like that. So it's really trying to fit a little bit of a niche. But the idea is that that could also expand to like the larger, like transportation systems, especially in dense urban environments, right? Not so much like, you know, the Midwest where you got to drive. Actually, I just drove to Rochester and back, and it reminded me like even Rochester, I worked in the Midwest for a long time. And even Rochester is closer to the Midwest than it is to the Boston right. So like, like just this spending, you know, a day there. I was like, Oh, I forgot how much I drove when I was in Rochester. So anyway, that's what Optimus is trying to do actually is like, fill that sort of part of the puzzle.

Interviewer

6:21

You say that the key system behaviors, they're focused on that last piece, kind of the same way Amazon kind of thinks about how do we get this package last mile? Right, and how do we get the rider that last bit?

Interviewee- Optimus Ride (supplier)

Okay, yeah, yeah, like one of the one of our use cases has always been like, how can we get from South Station to where we are, if you think about it, I don't know if you've ever come out there. But getting from South Station to where we are in the Marine Park is actually a pain. There's a way to do it, you can take a bunch of buses, but it's ridiculously complicated and takes a really long time. I'm not sure how efficient it is. But um, so that's kind of part of the idea, like in general, that's why this location, that location always seemed like a good, it was a good testing ground per se for them. But like, if you think about it, a lot of these other places we're looking at are like places that don't aren't served very well, like a campus or, you know, they I don't know, if you ever take the MIT shuttle that drives around in the circle, you know, what I'm talking about. But anyway, like, every university has something like that, right? Those kinds of things. And then also in other areas, like, we're deployed, like some of these,

For example, a Senior Center, like retirement communities, right, where people aren't really driving around, right? And having an easy way to go back and forth. This is why like electric vehicles, the electric vehicle aspect has been so important to us, right? Because we think that fits in actually, it's the right sort of mood as opposed to some 15 passenger van, righ?. I mean, one place we were at, like literally having a 15 passenger van, taking someone from their house, you know, four blocks down to like, the cafeteria over there, or the Rec Center is kind of ridiculous, right? Those sorts of things.

Interviewer

8:07

And if I can jump in here, I also see that the driver is one of the highest costs of the operation. So if you remove that, it makes it way more affordable. Right?

Interviewee- Optimus Ride (supplier)

Right, right. Actually, I think that the other way to think about it, though, is that this is what we see as the vehicles we use now are actually like six passengers. And like, as you scale the vehicle, you're moving away from electric cars, it's just not realistic, right? And like what happens is that you know, us even using one seat for a driver makes it now a fact five passenger vehicle and it gets like, now you're talking about well now you need to have these and then all sudden you're like, well, I'll just get a bus but now it's diesel or something or you know, and then then you have a driver so like, there is a point where like, if you need to move a lot of people all the time afterwards, right? Not gonna do that, right? Our technology might be able to be thrown on a bus but that's a whole different thing. Does your transportation solve a transportation problem but I mean, think about it, right? Like if we have six people because there's a limit to what you can do with the size of the vehicle before you start running into a lot of regulatory problems like after 3000 pounds, you're no longer a low speed vehicle. So now the vehicle gets bigger and heavier now even the bigger power train like don't forget electric vehicle technology. You know, yeah, Tesla's doing great and we're all doing great yay. Actually,

my technology, I forget what the technology strategy class I took at MIT we predicted was our class project was to predict whether or not electric vehicles would take off right and like even back then we were like, yeah, they could but we need batteries and like, that hasn't really been answered. We're just getting better at making more of it. So like, even then it's more for cars like no one's scaling a V's up to buses, right? So like, there is a little bit of like well if you have to put a person in a gem like we're using like a little six passenger car what's the point right, I mean what if an EV seats more people? Like a nun? Right, just the case.
Like, the closest things are these like autonomous shuttles people are trying to design that or like Evie based. So anyway, but yes, the person. Yeah, I won't speak to profitability. But yes, of course, right? I mean, but that's like the Uber or Lyft argument like, oh, we're gonna make it safer. Like Yeah, you're very altruistic my ass, like trying to make your business, ideally, even more profitable than it was before. Right? So anyway, yeah.

Interviewer

10:48

I guess my question is, when you started with Optimus Ride, was the vision and the mission pretty much the same to what it is now? Or has it been evolving as EV technology advances, and you guys get your arms around the problem a little bit more?

Interviewee- Optimus Ride (supplier)

11:06

It's pretty much the same. I think that the type of areas that we are focusing on, like the type of places have shifted slightly as we've sort of, as a built a better, like, understand the market and the business case more around, like, Where could this come fit in for like, like, what you guys were just talking about? Well, okay, if there's a lot of things, what we're noticing is that we're even supplementing some of these larger, like a university that that buses, people all over the place, they don't really want us to come and replace that it's the downtime in between where we're, we look like a much more attractive solution, right? And being autonomous would be important then right? Where we're like, we don't have to have that driver, but like, in those times are supplementing like non peak route non non high demand routes, or where like, they're like, hey, you guys could really fit in, right here. Because, again, everyone knows there's no electric buses running around. So like, that's where we've been focusing, because there's also this idea of like, inside denser urban environments, there's other challenges just around like, the EV technology itself, it's like, having the right vehicle drive around is, like, tricky, can be tricky at times. So there's another dimension there that's like, you know, makes it harder to break through in some area, right? And other things that we won't get into that are even more complicated, like, you know, you can't just supplement something like public transportation with your system that is unionized, like there's a whole labor sort of balancing thing going on. And so those conversations get really complicated really fast as you can imagine, right? So we realized that I don't think our idea has changed. It's just like what areas we think are the most likely to go after first that would be successful has sort of evolved and matured over time as we just got better ideas as we just learned more so.

Interviewer

12:57

Yeah, yeah, we talk all the time in the course about the key stakeholders and you know, some of the obvious right it seems like you know, you've got the passengers and the riders but then I'd imagine there's a lot of red tape.

Interviewee- Optimus Ride (supplier)

Yeah, well, it's not too bad, but I'll give you a bone to go look at if you look at the city of Boston application to do EV testing. If you read through that there's a section that talks about fares about charging people for rides and explicitly that you can't and that's not in there because like it's not okay to charge people it's because it's very complicated. And you have things like the MBTA and such and like, how that's perceived can be politically skewed, there's all sorts of crazy things but like, it's clearly written in there that like we can't do it even if we wanted to, we'd have to go and ask like permission like we have to get explicit permission for non top Optimus people like to give demos right just to make sure like we can't be explicitly can't charge people for a ride right so anyway, just as like if you're curious you can go read that. Now, if you look at California, it's actually different. Like there are different versions and there's like a version that's like yeah, you can deploy this as a product now whether or not how you get regulated it's probably who knows right? You're probably falling under like TNC or taxi you know, all that super complicated, too. So I'm sure that will be the next round of debate. Once someone has something they can go and say look, I'm something like, what are you I'm this right versus that or something? Right?

Interviewer

14:31

Just one small question there. So to what point does it make sense to be in Boston right? I mean, if you can't operate in the city does it make sense to be there?

Interviewee- Optimus Ride (supplier)

15:00

I don't think it matters for what we're doing for the development side, it doesn't matter. I mean, we deploy all over the country, we've had deployments in California, we have one in Brooklyn, And we've had one south of here, we've had one in Washington, we have one in Virginia, we have a bunch of other ones that we're looking at all over the country. I don't think it really matters because you're not going to deploy to a single place anyways, and like, be grounded. I mean, the fact that we're driving around San Francisco is because that's where they drove the car out, that's where they were, that has nothing to do with their any supposed business case, or whatsoever. I don't, I think it's like being isolated. It's not too hard to stand up. Well, it is hard, let me rephrase that. It is hard to stand up in a place and run the technology. But like, I don't think it is a blocker. You know, as a matter of fact, I think we probably know more about deploying autonomous vehicles than anyone else, quite honestly, just because we've actually tried to deploy them for real besides just Chandler, or in Austin. So we actually know a lot about that. So I don't think it's a blocker from our I imagine.

Interviewer

16:00

Interesting. You mentioned as well that you have these buses deployed throughout the country, But we were going through the website and we couldn't find any projects. Where are these projects being operated? Like continuously?

Interviewee- Optimus Ride (supplier)
17:36
Yeah, no, actually, every project we've ever had has been a contract base. Like, we've never done a demo actually, like a pilot project. We call them pilots, because the only place that we do that type of driving is in Boston, because again, we don't actually do any, what we would call a deployment. We've deployed in many places with the first place within Southway Miss in this community called Union Point, but we don't do that anymore. We have an active deployment in the Brooklyn Navy Yard that should be on the website. Another one is this.
We had a deployment in California, in Paradise Valley estates, which was a retirement home, we don't do that anymore. COVID sort of killed that whole thing, because everyone just sort of locked down, right?
We have a deployment in, in Washington DC, at the Yards, which is another sort of like, small, sort of private area, we've been focused on these private areas, mostly, though, we're looking to expand it into Washington DC a little bit.
And also, we have another one that's in a business park in Reston, Virginia, that one's on hold because the people who work at that building are all working remotely. So like we basically put that on ice until they come back because there's no point in driving around with no passengers. So we've mostly been focused on business parks and private areas, like all these have been private areas, some type of business park or retirement home or something like that. So the seaport, the Marine Park, where we actually are testing just happens to be representative of some of the types of areas. So that's how it's useful. And then we drive in the greater area, like in this seaport district, but that's more because it's just more complicated. So we can test different parts of the system, like traffic lights, or multi lane things that aren't actually in the Marine Park where we're based. But anyway, yeah, I don't know what's on the website. Currently, they're always updating it. But like, right now, I guess we technically have two active deployments like that are actually running passengers.
So actually, the Brooklyn Navy Yard, it's open to the public. So if you go out there, you can just ride. Yeah, it's there, I forget which ferry but one of the ferries from Manhattan stops there. And then we take passengers from there to the gate because that area is technically still closed. It's not public, it's a private area. And then we take people to the gate so they can get out into, like, that part of Brooklyn.
Interviewer
19:07
Nice. What is the user experience like with that for? For instance, if I got off the ferry in Brooklyn, how would I get on one of these?
Interviewee- Optimus Ride (supplier)
19:26
So in that case, that's just where they're so if you want to hitch a ride, it's if you get off the ferry, you can jump on. And then they just take you down to the other end. And the same way if people come through that gate, there's a stop and if they don't want to walk or whatever, they can wait and then hop on one of the shuttles that drives them down. The shuttle goes all day long. Like I forget the time right now, things have moved around. So basically, that one's free. Well free because you took the ferry or you're going to the ferry, one in Washington DC is

specific for people who live in certain buildings around there because the property owners are the one who have us do it. So like that's the server.
They want it for their clients, like people live in the building to go to different parts of the area. So that's what we do for that. So that when you couldn't do because you have to be like a tenant or resident or something or working in one of the buildings.
And then the other one was like, we were showing people from a parking lot to the main building. So that was different because we just waited and people just loaded on and we took them. So sometimes it's reservation based, depending on what it is. So like, I think the one in Washington is reservation based. The one and BNY is just whoever shows up can jump on and go. So that's why I said if you take the ferry technically, that's just the general public. So well, general public meaning like, it's not like they work for someone or something that we're catering to. So yeah.

Interviewer

20:43

Cool. Just to clarify that point. Are these shuttles operating as autonomous vehicles, or are they driven by people?

Interviewee- Optimus Ride (supplier)

20:58

All the time, all these appointments, we have the vehicles trying to be running autonomously, but we do still have a safety driver, do we still have people inside?
Oh, one thing to know is that like, we actually are being hired as a transportation service. So if we have to drive the cars in manual, we do it because at the end of the day, our job is to move people from one spot to the other. Yeah. But ideally, a lot of these companies hire us, because it's partly like, oh, this is great. How can this be morphed into the future promoted? Guys? Right? So that's sort of so a little bit is us learning how to run a site, a little bit of them is to understand. But right now, the vehicle is not either, the vehicle itself is not ready to be autonomous. It's not like an autonomous ready vehicle, right? We actually developed it, but that's a different story about that. That's a different thing altogether. But um, but actually the safety driver is still part of the system per se, but the car is like, generally, we try to run fully autonomous, like we actually do a pretty good job, because our fixed routes, like running it mostly autonomous, like most of the time, and then we use the learning to like improve the software, you know, learn about the reliability of the system or something like that.

Interviewer

22:15

What do you see as the biggest hurdle to get from that safety driver, man in the loop architecture to getting to that fully autonomous stage?

Interviewee- Optimus Ride (supplier)

22:25

There's a couple things. I think one is what is your overall safety case? Like? How are you going to claim the system is safe? Because no one has done it yet. So technically, you have to do it. To some extent, Waymo has sort of done it in Chandler, but there's a lot of it's unclear what they did, they just briefly explained. So there's a little bit of I think that's one of the things, though, I don't think that's well, in my opinion, that's not insurmountable. But there's a lot of work there.

I think that to actually deploy a safety critical system like this, there's a lot of new technologies that seem to be on the right trajectory now that weren't there before, like the type of computer you need with the type of rating, the type of reliability really didn't exist till kind of a year ago. And so like, a lot of that stuff has to be actually done, right. So I think a lot of the sensors to like before, when I started in this field, there was no such thing as no one, like if you said, hey, can I get an automotive grade, which just means a certain level of reliability, and safety, something that has like a safety rating on it? For lenses, LIDAR will laugh at you, right? Like, what are you talking about?
But now that's not crazy, right? Like, everyone has roadmaps and plans, but they're not actually done yet. Right? So like, you know, if these guys say, yeah, we changed our mind. Right? Then you might be out of this sensor that you need to like, actually, like, you know, that just has a level of performance that's expected for these types of systems. I think that's another sort of, maybe, let's call it risk, right? Like it, we're on the right trajectory, but the sound like I can go and like just pick all these things, right? There's still sort of, a lot of these are still like, yes, we can do it. Yes, we're on the right path. Right. Um, and then I do think they're still just some open questions of like, which, you know, like, I guess a little bit back to the safety case, but like, which, which, which technologies are fully developed enough, right? Like, it's not that you can't use machine learning algorithms? It's more like, how do you use them? And how, what confidence do you have in them when you use them? And like, that's an unanswered question. So like, if you're trying to use a machine learning algorithm as a purely black box, I think you're gonna have a really hard time saying much about it unless you have some other thing you can say about it more than like, what is sort of, kind of considered state of the art.
I think right now, this idea that data will save you is a little bit of a tricky argument. If you're certain companies who just have access to a lot of data, it seems appealing, but like, I guess my argument was, if that's true, then they would have been done already. So I don't know if just data alone can save you. There's a risk that the…
I don't like to talk this way, I'm not using the word AI on purpose, because I don't think AI actually has anything to do with self-driving cars. Like that's a little bit of like, missing a misnomer, like misuse of language, quite honestly, I'm driving is not, I don't know how many people maybe some people are trying to make like,
So real driving, by the way is like a, like, it's not a soft AI problem. It's a hard shot, like a general AI problem, right? I'm not sure we're not interested in solving that. Like, that's a research problem. I'm not even sure, quite honestly, it was from a safety person who spent a lot of time now looking at driving data and like how people drive, I don't think I want to train a robot to drive like a person. I don't think it's a good idea. People drive with this, like, an unknown amount of extra risk that you can't even imagine like, sometimes we have to because of the way the roads are designed, sometimes they do because we're just not aware. A lot of times we do it because we think we're much better drivers than we actually are. But like, considering I have an automotive engineer who was trained as a test driver, like, I'm slightly biased, but actually looking at the data is like has been quite enlightening. Like, I've been able to actually measure this stuff for real and say, Oh my god, right? Like, it's actually changed my driving behavior slightly. Like, there's certain things I won't do, because in my mind, I'm like, calculating things like, oh, whoa, the tiny collision that is like under one second. So the only way to avoid

an accident is if this guy decides to stop? Yeah, you know what? I'll wait, I'll wait a minute. Oh, wait a second, and then I'll go right. So like, I think that people just don't. And this concept is not very easy to explain to people, quite honestly. Actually, I stopped because I tried once in a talk and I might have offended everyone in the audience. When I asked them, I was like, so you guys all think you're good drivers, right?
You're not. So I don't think I've had to change my explanation. So anyway, I think that that's another one is like how you use machine learning in your overall system. And how you're trying to solve the problem makes it either, like tractable, or like really hard. I mean, if you could make a system, right, like, AI robot or something? Sure, that would be awesome. But quite honestly, I don't know if you'd use it to solve the driving problem. I think there's a couple other problems that might be more interesting for that type of technology. But, you know, maybe I'm, maybe I'm wrong. I am just an automotive engineer. So maybe I have a different take on this. But anyway, I
think that's the other hurdle, I'm not sure.
It's not clear to me how important that really is, right? Like I think for our use case, it's less. But whether or not that translates well, I don't know if you've ever heard about this fat tail problem. I've called it the proposed fat tail, because I don't know if it actually exists. It's just an idea. So this idea, and it's applied to machine learning that like a distribution of like driving is very driving and normal is really complex, you don't know what you're going to see in the way these machine learning algorithms operate. You're not 100% sure, like, have you tested it validated enough, right?
The idea is that these distributions are actually very fat tails, right? So like, it looks normal, but then the tail doesn't come down, it actually stays fat. And what you usually argue away is that well, well, that's way far down whatever, Six Sigma seven sigma, I don't care, right, when generally that holds true, right? But there's this argument that well, actually driving in the environment are some of the things we're looking at are the way the machine learning algorithms are taught or learned. The fat tail is important, because if something happens in that fat tail in that tail, it could be like safety critical, let's just use a really bad example. Let's say your neural network doesn't learn how to deal with tractor trailers. Right? And you just happen to operate in an environment that never has tractor trailers, but could well, does that mean you have to ignore tractor trailers? Because if a tractor trailer does show up, what happens is it ends in an accident, then the argument is, is well, yes. But to search for that fat tail is basically impossible. It's unknowable, right? Because that's the whole definition of it, right? There's these random events that are actually very likely to happen, right? Not but not under the normal distribution. But when they do happen, they have the same sort of impact as the normal as the ones in the regular distribution that you would normally test for. So you can't argue that you can't test enough to cover all that space because it's impossible, right? So whether or not that holds true, that's a really hard problem. And you might have to fundamentally change your approach, right? Like, this is like knowable, ai or defendable AI are all these terms they use for it. That's like sort of the one of the ideas around trying to address that but the other one could be test enough until you prove that it's okay, but that's possible, like, that goes against everything I ever learned as an engineer, like you can't test something like to that point, especially C, D, which is a negative negative requirement, right? You can't

actually prove it, right. So anyway, that's another probably a big thing that's holding things up. So if you don't use any machine learning, it's not a problem. But then the argument is, it's probably not gonna be that good of a system, because some of the machine learning aspects really do open up the possibility of like, what you can do is quite amazing, actually.
So, but anyway, sorry, that was a little long. My apologies on that.

Interviewer

No, that's great. It's so new to me. I imagine you've talked about this a lot of times. So it might look repetitive, but it's not.

Interviewee- Optimus Ride (supplier)

30:52

You know, it's actually not at all. No, just the bits and pieces from time to time.

Interviewer

31:02

Is it a correct understanding of that fat tail problem that, like where you normally refer to something like that as an edge case? But in driving there's, you know, an infinite number of edge cases? Right? You would call it an edge case? But is it really an edge? There's only if there was an edge, right?

Interviewee- Optimus Ride (supplier)

31:48

Right, exactly. So like me, again, I call it the mythical fat tail, because what you don't want actually has a real distribution. But it makes sense. I can send you the paper, if you're interested in like, legit generic explanation of it. Which is actually a pretty good overview. It's not very technical, the person who was talking about it. But I mean, it's, I don't think the analogy is wrong. Whether or not it's an actual distribution like that is debatable.
Unfortunately, driving and where you live is very context specific. But like, it's like, a known or unknown neural network, can you detect the guy in the chicken suit, right? Or is it going to throw it out and not think it's a person? That kind of stuff, right? Like, well, does that mean I have to train for everyone in every kind of chicken suit? When I usually use the guy with the yellow shirt like, well, if my neural network can't see people with yellow shirts, do I have to like, you know, what do I do? But that's a stupid example. But to my point like that, is that stupid, right? Like, first of all, if that's your design, it's a shitty, it's a crappy design.
That's more where I come from. I'm like, well, maybe you're thinking about the problem wrong. If you're relying on this thing to do that, like do that part of it, like solve that part of the problem. But anyway, but yes, you're right, the edge cases are good. That's exactly where it comes from, actually. Is that thinking?

Interviewer

32:42

I have a question. So one of the things they asked us to identify and prioritize are the needs of the people that are hypothetically taking a shuttle. I can easily see that safety is important. I imagine regulation is very harsh on you if you don't operate safely.

Interviewee- Optimus Ride (supplier)

33:54

I can explain that. Not that that's not necessarily true. But that's okay. But your idea is correct. Meaning this, so I don't race there first, there's no EV regulations, per se. There's some DOT like local state, sort of, I guess you could call it regulations. I call them more like registration laws. And like some limitations. The federal government doesn't have any. I'm not sure if they'll ever make any, because that's really not their thing. They don't like to do that, at least in the past, maybe it'll change their mind.
But safety is important. Like I was talking to someone the other day, it's not that, you know, without our system being safe, like you said, we don't actually have a product, right? Because people aren't going to get into the system. If it's not safe there, they're going to assume that it's safe. Or if there's something that demonstrates that it's not then we're done, right? There's no weather, weather needs to come in, you know, ask us what we're doing or something almost becomes a moot point. Right? Because people won't, won't take it right. Yeah, I don't think we have a task of Tesla to get away with whatever we want and people like I don't think we can blame the user and say oh, well they just use the system wrong, don't worry about it. So but but but you're right it is like I would almost say that it's required but people it's just an expectation, right?
Interviewer
34:41
Yeah, I imagine that for example, in these shuttles that you have in service in Manhattan, people jump in the shuttle and don't ask questions right? Is safety the number one need for passengers?
People might be looking for, I don't know, saving time or just trying out the new technology?
35:25
Yeah, it's very interesting actually. I don't know if people think our system is safe because they just see a person there and they assume it's fine. I don't worry about it. It'd be interesting to see what happens when there's no one in the car. I mean we've had vehicles that don't actually need people inside of them that we can run in like an untested course that's a little bit surreal at first. But I don't know, I'm also highly biased so it's hard for me to use my personal judgments because like you know, I'm used to it, I have different expectations from what we've seen. Some people care, other people actually could care less you know, they just assume that it works and it works. Other people are more in tune, but I don't know right now so one thing we have learned is most people are very curious and they asked the drivers actually. We have to tell them to leave the drivers alone so they can focus on monitoring the system, which is part of their job, we've heard from other people too so it's not just us I think that's just like a natural thing.
The thing I'm curious about is like if that goes away, my guess would be yes, like the no button novelty will fall off pretty quickly. But I don't know if we're actually there yet. I actually, like we said we have like a product team, which actually focus on probably everything but safety. And we focus basically on safety. Because like again, I think without the system being safe, it has to be safe. There's just no question right? If it's not safe, what are the people looking for? Like you said, right, are they looking for convenience? Or you know, how do they need to get from point A to B is it efficient right? Is it whatever that they're looking for right? I think that is actually a

question right? Because that's the thing that's actually going to make it successful, the safe thing is like make or break if it's not safe forget you're done. Who cares what else it does right? But if it's but you know but so I think I've been telling them like yeah so it's got to be safe right? Like like but it doesn't have to be easy to use or convenient or anything else that we that actually makes it a like a good product right so or a good service so another thing that came to me is so when you talk about these shuttles for me

Interviewer

37:40

I kind of think of bikes and scooters as your direct competitors right? They are covering the last mile. But when it's raining or cold, people might not want to ride bikes. I can see a comfort need there that you are covering.Who's interested in your service?

Interviewee- Optimus Ride (supplier)

Believe it or not we don't really have much problem finding places that want to try us out. Right, like of course everyone wants it to be fully autonomous like it's very interesting like the requirements people have like apparently the vehicle should disappear. Like they don't want to pocketing like well like it's a physical thing it doesn't like to fly away that would be perfect if it did for them. But um you know, again they don't like Ubers because they clog everything up but the thing they probably like about Ubers is they don't have to deal with them right? So you know what is actually interesting is that even though it looks like a small niche market because we're not trying to do this like urban you know, TN TNC sort of thing right like the robo taxi idea they call the robo taxi like we actually don't have anyone like we actually find there's lots and lots of people are interested.

Interviewer

39:41

I think that's about all I have. Do you have anything else?

Interviewer

39:45

No, no, I'm quite done actually. Very interesting. Everything. I wanted to ask you a slightly different question. So when do you think Optimus' ride will be able to work properly and stretch?

Is this like a five year project? 10 year project?

Interviewee- Optimus Ride (supplier)

40:25

Ah, see, how do I say this? Only because I don't know what's been publicly announced. We're trying to do it relatively? I would say we're trying to do it soon. I'll leave it at that. I think but let me answer your question in a little bit more specific way. So yes, we're trying to do it soon, basically, because we think we have, we I think we haven't, like I said, we think what we need to get in place is getting there.

And so it's opening up the opportunity to actually like, have systems deployable, like, for example, one thing that we announced publicly was that we have a partnership with players who make the electric vehicles that we currently are using, but they're not anonymous ready. So we are working jointly with them to develop an actual autonomous ready vehicle. So that's something we didn't have before, like we retrofit the cars but like, retrofitting the cars, doesn't

give you things like fault tolerance, steering, and braking. Those are very complicated things that need, you know, companies to go develop, and which, you know, we're more focused on the software and the service, not necessarily like in like the integration side, not necessarily developing like automotive components. So like, the fact that we're working with them gives us now a platform that we can use that's actually autonomous, ready, that fits kind of how we wanted like the model that we had in our mind.
So with that, plus some other, ongoing like, like I said, like the sensors and the computers actually being able to get, you know, the reliability and ratings that we need, we actually think we can get out soon. I'll leave it at that for now. Um, now, if you look at some, I think that there's a bigger question in my mind still about like,
I mean, again, but our focus is like these restricted, like constrained sort of environments, we're not saying we're going to be driving across Boston. I mean, if you ask me, like the time, you know, can I drive from Kendall Square to Harvard Square? Yeah, I don't know. It's gonna be a while, like, as a hard man really, really hard.
I think that if you look at what Waymo was doing in Chandler now, like, if you've ever watched some of that stuff, you can see some of their difficulties. I mean, they're doing it without a driver, right? I think that goes to like, give you an idea of like, you can do that, though. I don't think Waymo is actually interested in doing that, right? Waymo's is interested in the bigger thing, which is like driving across cities, right? Which is why they're gonna try to start doing in San Francisco. We'll see how that goes. But like, that's what they're gonna try to do.
I don't know, I'm hesitant. I think my guess originally was that when I was at MIT, because my project together with the other project we did was actually in self driving cars. One of the projects we did I think was called Now, so interestingly everything in the year I was there. What is the project you guys do? What's that called? The big Capstone? Capstone. Thank you. That's it. My capstone project was we were looking at self-driving cars. And like, they asked us like to predict when we thought, you know, and like, I think even at the time, my guess, if I remember correctly, was like, in 20 years, which was now seven years ago, I still think I'm on track like, and I think those you'll start seeing different parts of it. Like I think if you talk about what we're looking at the constraints sort of urban, like, you can see Waymo kind of can show like, sort of prove that it's feasible, even though they're operating a little bit more expanded. If you look at what they're doing, they're actually operating in a little bit more complex things. And like, a lot of the highway stuff is possible. Tesla's doing it badly, but other people like GM and Ford are starting to roll out systems that can actually do it pretty well, to some extent, though, they won't go as fast as Tesla's trying to go though. So I think that you'll see this like a highway. You'll see these two use cases, and then connecting between them, I think will take a long time because it's not trivial to make that bridge, but it's easy to drive on the highway. That's not a hard problem. Or like, it might be easy to say driving this little circle. That's probably doable, but like say, drive across Boston. Yeah, I don't know.
There's it, it's not just a technology I think it has to do with other aspects that are out of our control. Like road design, like again, how good does the system actually have to be like? I don't know, like roads and driving has evolved as a human activity. And like, those things aren't easy. You know, what if you want self driving cars, get rid of all human drivers. seriously be super easy. Everyone drives from the same set of rules. You just have to deal with pedestrians, not

hard, or bicyclists. Matter of fact, you probably rather be like, I mean, like, let's not say that because that's not true. I'll keep my mouth shut right now. I was gonna say, like those, those problems to make them safe aren't aren't actually that super difficult, right? Like, but it's just like trying to figure out what everyone's doing is the hard part, right? Like, what's this guy doing? The backing up? Is he turning around? Why is he even doing that? Right? Like that sort of stuff? Like, where does that get? Like, why is he doing this thing? That's the hard stuff. Because the robots dumb, right? It doesn't know what's going on. Right? It's like trying to predict, simply right, and it's just too difficult.
So I mean, I mean, how many times have you driven around and been like, what is going on here? You just sit and wait, right? Like, I don't know what's happening in front of me. I'm just gonna wait for it to play out. And then I'll decide what to do. Right? So anyway.

Interviewer

45:59

I'd imagine Boston is a pretty difficult proving ground. If you can drive in Boston...

Interviewee- Optimus Ride (supplier)

46:35

Nonsense. Boston's nonsense, like seriously, it's just this, some of it's nonsense, like, but I don't, I'm starting to find I pay just a lot more attention than I used to. Right? Because it's my job now. And like, sometimes I'm just like, what was going on? Right? Like, even things about, like, how the road is designed, like totally wrong, like on purpose, like, they paint lanes incorrectly. And I'm like, how did you do that? Right. And now you're trying to make a robot understand a lot of the right thing to do, like…
People keep telling me like, about like, red lights, we always talk about emergency vehicles. And they're like, oh, it's okay to drive through a red light. I'm like, NO, it's not. Like I was like, but as a human, you take the risk to drive through a red light. But I'm curious what will happen if you get hit by a car, I bet you all of a sudden wouldn't be right anymore. Like you'll be at fault. I think the only way it's okay is if someone literally a cop, or like a fireman says come through the red light.
Unless they're doing that technically is not legal, like how do you program a robot to do that, right? Like, you know what I mean? Like it's not so it's not so simple. The things we take for granted that are just like being nice, or the right thing to do. Like, I think if you cause an accident, you would find very quickly that the nice thing you did, or the right thing you did was actually wrong, like, like from a liability standpoint. So like, it really puts some of these things in focus that that that we sort of shrug off because of the possibility of giving. But usually it doesn't end in an accident, right? So you're like, oh, whatever. That's fine. I got away with it. Right? So anyway, these are the things I think about all day.
I'll give you a very simple one. I don't know you guys. Are you guys in Boston right now or not? Yeah. Okay, so let me ask you this. Do you know what the proper way to handle pedestrians in a crosswalk is and like Massachusetts? So let me give you an example. Like if a pedestrian enters the crosswalk on the opposite side of the road? Do you know are you supposed to stop or go the opposite lane so you're let's say you're going like let's say you're going north? And then on the west and the West? on the west side? They enter the intersection at the crosswalk? Do you stop for them? Or do you go?

Interviewer
48:28
I've always said stop.
Interviewee- Optimus Ride (supplier)
48:31
Right? You are supposed to stop, do people normally stop? No.
So let me ask you this. If someone's exiting the crowd so let's say now you're coming up to the crosswalk and someone enters on the side of the road. So, all you know is you're supposed to stop dummy right? Yeah, yes, you're supposed to stop now. What are you supposed to do? Are you… Is it okay to go when they cross into the lane or when they get off the road?
Interviewer
48:56
I think it's gonna be when they get off the road but I'd be lying if I said I always waited …
Interviewee- Optimus Ride (supplier)
49:01
For Massachusetts, so in Massachusetts, it's when they get 10 feet from crossing the lane boundary you can go to other states and other states you can't you're not supposed to go until they get off the crosswalk because that's the way the laws are written. Well guess what happens when you wait for someone even in one of those states? Because that's how we programmed our car to get to the other end of the road. Everyone gets really super annoyed at you right? But that's the law as written literally as written right? No black and white is clean and clear as day right? So like, but you know so like who's right? Right? Well, we're right because we read the law. We programmed it but people don't think we are right. So anyway, like I don't even know how you deal with that right you know, education I guess but like, you know, I don't know it's not like cops are pulling people over. Right? Like hey, you went before this guy got off the side of the road because I'd be like, what are you crazy? What do you mean right? So anyway, that's my point is that it's a little bit, it's not easy to deal with some of these. So like, like that problem in itself. How do you start? Like we're I'm not an optimist rising, I'm gonna solve that problem. Neither is Waymo. Neither is the only thing we can do is drive normally. But I think driving normally opens you up for a lot of liability. Right?
50:22
Yeah, from everything I hear, it seems like it's very hard to move forward. Do you find significant contributions from institutions ? Is Boston city helping you modify the infrastructure for example? Do you have any stakeholder that is actually promoting your work?
Interviewee- Optimus Ride (supplier)
50:58
Yeah. So the city of Boston, part of our deal with the city of Boston, is to actually feed that type of information to them. So the in the Boston we don't do deployments, right, we don't, we don't actually run services, we just do testing. We just drive around and try the system out and like part of our reporting is to give them feedback, like, hey, what makes this harder that would make this easier in the future, right? Because they're looking like more future looking. And we're like, well, first of all, paint the roads, right? Like, like, seriously, like, even simple requests like that, but they are one of the stakeholders. And so like, one of the reasons why I think it's

feasible for us is because if you're in a constrained environment, it's really easy to like hone in on those two or three obnoxious things like hey, paint a crosswalk here.
Hey, why don't you put more signs here so this is done correctly like those sorts of things are really feasible because you're only doing it one or two places you're not doing it across the city, right? Like Boston's Vision Zero city. If they really wanted to make the roads really safe all they need to do is start like doing traffic enforcement in the city. You don't need ADS for that and they could reduce the accident rate, like it would plummet just by them doing stricter enforcement right? But like we're not I mean, that's not the but like we do have the city of Boston like who are who are looking for that sort of feedback and like when we work with like these small like developers or like owners like they are interested in hearing what we find because they know that we're out there like sort of like hyper focused on like the safety of the road right and we can be like hey you know if you fix this this will make this better if you make this so it'll make it easier and they're usually pretty open to those what people don't like to do though is spend money right on infrastructure.
Like if you ask them to put in like hey, you should put in like you know smart traffic lights or like some are more lighting they're always like. Ah yeah, I don't know about that because like well it's really dark you know, so like, those sorts of things but it's funny how they're always open until you want them to spend money on fixing things but anyway, but yeah, we actually do find that that's like part of our plan. And like I said, they usually like to listen and are willing to hear what we have to what we're asking for.

Interviewer

53:16

I think I'm good. Thanks so much, ***Interviewee- Optimus Ride (supplier)***. I really appreciate it. It was a pleasure talking.

Interviewee- Optimus Ride (supplier)

53:22

Yeah, it's always good to catch up with some SDM people. I've been out of the loop for a while now because I'm buried in my own little world so I don't get out much these days. I'll send you that fat tail paper just so you know what I was… So you have a better reference to my babbling about it so it was a very short paper. It's not very technical. It just sort of introduces it a little bit again. I think he took a little bit of liberty of using the fat tail example but whatever it's a big deal in financial modeling like stocks and stuff right because the fat tail Black Swan same kind of idea. Like the same you can call the fat tail the statistical distribution of the Black Swan or something like that if you want it to but when it comes to machine learning is it really a black swan is like what they're getting is a really an edge case. Maybe not right? So anyway, guys, hey, it was great talking to you and good luck with your class.

***Support material, paper on fet tail explanation provided by stakeholder- Optimus Ride supplier https://users.ece.cmu.edu/~koopman/pubs/koopman18_heavy_tail_ceiling.pdf**

Eastgate or Westgate Residents Executive Committee

Interviewer: Maybe a little bit about your background and your role and how long you've been at MIT and around the campus area.

Interviewee: Sure. Um, so I'm in my third year now. I'm a PhD student in the mechanical engineering department. I've formerly lived in Westgate, being the president there. I was offered a graduate family dorm, and currently I'm in Simmons. So, I'm in an undergraduate dorm now. Both dorms are on west campus. My office is right in building 35 right at Mass Ave and Vassar. Formerly I've done degrees in Germany, China, and Australia. So, I've gotten around a bit, tested out some public transport systems.

Interviewer: So you've seen a lot of different transportation systems and use them across all countries that you have been. When you start thinking about public transportation, what are your thoughts, as far as what do you look for and what do you need from them, how can they serve you best?

Interviewee: Yeah so, I think there are some things that need to happen for me to use public transportation. If I use it for casual use, so not getting to work, or getting to something that's on a regularly scheduled time. I want public transportation to arrive at my stop. After a short amount of time, I wouldn't use public transportation. If I randomly go to the bus stop, I have to wait 15 to 20 minutes for the next bus to arrive. So that's something I look for. So, I guess it's like a quick periodicity for transportation options. And then the other one would be that there is a low number of transfers. If I want to go to any given location. I think that probably depends on the distance of the location, but probably for things that are in Cambridge, it would be ideally no transfer at all. And then if it was Boston, maybe one transfer, and if it was something in the outskirts, maybe two, max of three transfers probably.

Interviewer: Very good. So, to touch on those, and correct me if I'm wrong, I think what I heard was that you're really looking for flexibility of availability of the trains that are available and are flexible around different schedules, not just really set around when we go to the office and when we leave the office. But also, you're looking within that flexibility that there is enough optionality so that you'll be able to go to different places and not have to jump from train to train to train and really go in a circle, because you want to go one mile.

Interviewee: Right, because I personally don't use public transportation to go to work because it's a 10-minute walk. It really wouldn't make sense, but I know that I would be willing to invest more time researching an ideal route if I went to work. I think even if I use public transportation to go to work, I would be minimizing time spent on public transportation, minimizing transfers. It should be as convenient as possible.

Interviewer: You discussed that you don't really use public transportation. Now, when you do use it, maybe it's not for work but for other things, the current systems that you do use, what do you like about it? What do you dislike about it? What do you look for?

Interviewee: So, I don't actually use much public transportation in Boston because on the west side of campus access is very poor. So I think for example, any of the closest T stations is about a 20 minute walk away. And if I have to walk two minutes to the closest T station. I might as well just walk to wherever I need to go. I brought my own car because I like to do long travels. And I think for example in Europe, you have other transportation options. Europe has a very good train system, so it's very easy and fairly cheap to use trains to get to places. Whereas in the U.S., for trains, if I'm going to New York City over Thanksgiving and it turns out that train tickets are almost as expensive as just taking my own car and parking with pre-booked parking spaces. Why would I trade the convenience of having my own car and being able to leave on my own time and having my own space for taking a bus. Bus potentially being late, having to share with other people. And then I feel like in Europe the price is low enough, which I know is a conundrum because prices are high because not as many people use public transportation here and it's kind of a never-ending cycle.

Interviewer: It's like a never-ending feedback loop right? It's expensive, so nobody uses it so that it has to be expensive because nobody uses it and then it just goes back.

Interviewee

Exactly, and then the same with fever lines. Because I know for the U.S., Boston is considered to be a very good place for public transportation. But I think in a global context that's not necessarily true. For example, I studied in Aachen, which has about 250,000 to 300,000 people. I never had to check my app when I wanted to go anywhere. Because I knew I could get from any spot in the city to any other spot in the city, in half an hour using public transportation. I would just have to walk to the next bus station, and I knew there would be some buses. Maybe I had to transfer once, maybe I wouldn't have to transfer, and also the routes were planned very conveniently. There were some cycle routes and some routes that would kind of dissect the cycle. So it was very convenient to switch between different routes.

Interviewer: I think what I heard is that, when you start thinking about the public transportation that we have in Cambridge and Boston compared to your experiences in the past, public transportation was always the best option compared to having your own car and driving around. And now when we compare Boston or Cambridge, you just mentioned that between the central station or the MIT station, campus really falls right in the middle of that, so it's almost never a good option just to get T to and from work. It is much better to just use your own car and that becomes a better option. So unless the transportation system that we are designing can provide more optionality or a cheaper fare than somebody's vehicle bill. It could get back to that negative loop that people don't use it because it's expensive or it's not convenient. If they don't use it and it's not convenient, then there is no budget to make improvements or make changes on it.

Interviewee: Exactly, and I think, I mean oftentimes I think in Europe for example, public transportation is not designed to make a profit. Right, it's designed. In line with this we'll need subsidies, and the reason we're doing this is not to make a profit.

Interviewer: Right, makes a lot of sense, it's looked at as a service like police, fire departments rather than, an airline that you can pay enough to fly across the country.

Interviewee: Very good. I mean I used to struggle because MIT has a shuttle service, but also for those that if you want to get from the west side of campus to Kendall, for example, I think the walk is about 20 minutes. So if I have to wait for your shuttle for 15 minutes and then if the shuttle ride takes five minutes, I might as well just walk outside and get exercise. So it's a bit difficult. Because I think a lot around campus was just walking or people riding their own little scooters or bikes. But then, it would be convenient to have the connection. If I wanted to go off campus, because for example, I think if I wanted to go to Fenway. I haven't looked into the bus lines, but I think they're all across Harvard Bridge, or if you wanted to take the T you would have to go to Kendall and basically make a roundabout, whereas if I walk, I would just walk directly over the bridge, and I'm almost at Fenway. So I think there's just the option so public transportation is competing with each other. There is also Uber. So for example, I'm married and any place off campus we almost always go together. So if you calculate two tickets on public transportation versus an Uber ride at least a year and a half ago. It wasn't much of a difference. I think now uber it is a bit trickier because they have a shortage of drivers, but also, I'm not going out as often anymore, with COVID.

Interviewer: That's a very good point. You know, I think some of the things that are picked up there that you mentioned in is that the public transportation needs to be the better alternative. If this transportation fails to be as fast, as convenient, or as inexpensive as other options then it definitely will not succeed. That really makes sense when you think about public transportation. And so we are talking about cost, a lot of flexibility, I'm picking these maybe some of your higher requirements and needs, where would you rank those, as well as maybe automation or sustainability or just some of the other things that you may look for now, in public transportation.

Interviewee: I mean I think public transportation is kind of inherently more sustainable than using your individual mode of transportation, unless you walk or bike. But I think flexibility and cost are both very high. And I'm not sure where I would make the trade off because the problem was with cost, you're always competing with your own mode of transportation, and at least if you own a car, then, that's usually just the cost of parking or maybe gas. Maybe a toll, which I know there is like certain cities I think New York City for example is thinking about passing on toll. So dissuading people from using their own mode of transportation, which is kind of sad because I guess the approach is to make one option harder, not make the other option easier

Interviewer: instead of improving upon the option that we have we are discouraging people. All right. That makes a lot of sense. So we started looking into Kendall and what MIT campus looks

like now, what are your thoughts about the growth of the city, and what the needs for the residents and students of the future look like.

Interviewee: Well, I mean, because I work on housing as well, or volunteer positions. I mean I think housing is like a big issue in Cambridge for MIT. And most of the dorms at MIT, sit on the west side of campus. Um, so, I think that, you know, connection and transportation from the west side of campus really isn't that good. Because Kendall Square is very far away from, from the west side of campus. If you had to walk to Kendall to access any type of public transportation option, it might not happen because that's just too far away.

Interviewer: We want to make sure that we get your input on what other things would you like to see in a transportation or in a new system, from the people who will be designing it. Is there anything else that you want to make sure that are considered outside of what we've already talked?

Interviewee: Well, I guess traffic is one thing to consider. Because it doesn't matter right if you're stuck in your own car or stuck in a bus in traffic, it's not very nice. So, if you have the transportation system that's decoupled from traffic jams then that could be another argument for people to use it especially if you go off MIT campus. You have that for example in the "T", right? The "T" isn't impacted by traffic jams, whereas the bus might be if there's no individual bus line. That's very difficult to plan because even some European cities have that. Stuttgart for example has a train system partially underground and partially overground and cars can cross the tracks, but the tracks are still tracks that cars can cross but they can't drive on them.

Interviewer *15:51*: Very good. So, when you're thinking about that, are you thinking the predictability of being able to get there when you think you're going to get there or are you just thinking that it would be more efficient than the traffic that we might experience.

Interviewee: Yeah, I mean both might be valuable in different settings, right, if I have a doctor's appointment and I really need to make sure I get there on time, then the predictability is very important, but if I just overall want to minimize the time I spend in traffic, then the latter one is more important.

Interviewer: Very good. Very good.

Interviewer: I will jump in a little bit. You mentioned that if Kendall was the hub and people were on the other side of campus--what do you think could be a possible solution that helps transfer people inside campus from different sides, like from east to west?

Interviewee: I think MIT already has a shuttle system that has different routes, and I think some of them are more convenient than others. One thing that I always noticed is, you have the complex of those sports grounds in the middle, and walking you can't really cross between the

two sides. The side of MIT that's right next to the Charles and the side that is next to the train tracks. You always kind of have to walk around those sports grounds, and that's pretty inconvenient if you just have to cross the sports grounds and then in two minutes, the bus goes there, which goes directly to Kendall Square, or I take it on my side but it will run around the corner and I think it does some weird things around Westgate, where it takes a sidetrack to serve some more buildings. So having a corridor to cross those fields might also be a nice thing to have, just to help people to get quickly to Kendall and not have long wait times. Because, I think, not as many people are using the shuttles right now. And that's one issue, why they're still running fairly frequent but not what I would call super-frequent every five minutes or so like, for example in London, if you're on any given line it comes every five minutes at least.

Interviewer: Very good.

Interviewee: And usually density helps with public transportation systems. And I know that Cambridge is, I think, one of the most densely settled areas in the US.

Interviewer: When you talk about the density, are you talking about the density of population?

Interviewee: Yes.

Interviewer: Okay, very good.

Interviewee: Because usually, the more that people live in a given area means more people then live five minutes from a bus stop, the higher the chance that a lot of people would use it, right?

Interviewer: So associated with that when you're thinking about a new system. I think what you've touched on the past couple points were that accessibility to the system, so it's not just about where is it going to be centrally located, but how can we get people there very quickly. Let the corridor actually talked about so that people can jump on shuttles, or just maybe even condensing the shuttle system so that it doesn't have to make as many stops so that way it could get people there quicker, you know, it may have only three or four stops, but if you go to any adult stops, you're going to have a place within a couple of minutes that can get you to me.

Interviewee: Yeah, and that's probably a sweet spot for the travel time, like, how far away should the closest bus stop be for people to still use it.

Interviewer: So, what would you consider that sweet spot for you?

Interviewee: Obviously, it's very convenient having it right in front of the door, I'm thinking back when I studied before wasn't very convenient. And I think you need to strategically locate your bus stops, so for example you would want one in front of Lobby 7, you would want one in front of Kendall, if that's your nod, so like strategically important points. And then, for example, if you

had a bus stop, maybe you wouldn't have one right in front of Simmons, and another one right in front of New Vassar, maybe you have one that is right in between the two.

Interviewer: That makes a lot of sense. So, to elaborate on that, how many, if we think about we're going to try to be solution neutral but you know, any kind of transportation is going to have to make stops, if you are thinking about going from any part of the campus, that we may be thinking, to the centralized location that let's call it Kendall Square, how many stops for a student would become too many between you and Kendall, that you would consider, if it's going to make that many stops, I'm going to just go in and walk anyways.

Interviewee: I think, if you're talking about like West End of campus to Kendall, the four or five stops would still be very reasonable, especially since, usually they're very quick, is just somebody jumping on, somebody jumping off, because the MIT shuttle is free, so there's no time spent on paying.

Interviewer: So you're thinking that if we would decide different lines, each of them with a maximum of four to five stops across our route so they can get to where they go, if each stop is 10 seconds and five minutes' drive so they'll get back to 10 minutes that you're talking about.

Interviewee: Yeah, but I still see like, for example, if Kendall is your hug, and somebody from the west side of campus wanted to go towards Watertown, for example, or towards the Fenway area that would still be a large, like, going around because from the west side of campus, it would be so much quicker to just directly go to Fenway while they're done go to Kendall, and then to Fenway. I think even if you optimize that, if people had to go to anything west of Harvard bridge, it might not be the best option competing with other modes of transportation.

Interviewer: So, in that context, are you thinking that a new system should be complementary to existing infrastructure rather than replacing them. So for example the fact that, we could talk about Kendall Square a couple times, are you thinking that the T is doing a good job of getting people to and from Kendall station, or Kendall Square or Harvard Square, what we're really missing is that middle ground, so if we're going to design something new, let's put something in the middle that would still go to Kendall so that people could switch, and both have different modes of transportation, but not leave the population out that really isn't this no man's land that is not close to Harvard, it's not close to Kendall, as you mentioned, we'll have to go around Boston before they could just go across the bridge.

Interviewee: Right, that's my impression. It's not like I'm using the red line very often to Kendall, so I'm not sure how well it's ours but I haven't really heard complaints, unless it's people from Kendall that need to get to places that are far away from Kendall, and not as convenient to get to.

Associate Dean Disability and Access Services, Student Support and Wellbeing Division of Student Life

1. On a scale of one to 10 - 10 being the best, how happy are you with on-campus transportation for (Bus, EZRide Shuttle, T, Walk, Bike, Scooter, Cars, etc.)? Why did you give that score?
   a. *Haven't utilized transportation since being absent from campus for ~18 months.*

2. Describe what ways you currently use on-campus transportation (Bus, EZRide Shuttle, T, Walk, Bike, Scooter, Cars, etc.)? If you do not use the campus transportation system, what is your means of transportation into campus and why?
   a. *Many people typically drive to campus due to the unreliability of the public transportation system (train and busses). Frequent delays and cancellation in public transportation make them less desirable. (Interviewee) both bikes and drives to MIT but describes the tension of bikers vs. automobiles and the conflicts of using the same roads.*
   b. *Increased people driving causes additional congestion around campus due to more vehicle commuters.*

3. What does the current student population look like in terms of students with disabilities? What is the breakdown of students with mobility disabilities?
   a. *There are hundreds of students with disabilities on campus with both visual and non-visual impairments. This information is not openly available due to restrictions in information.*
   b. *Many people with disabilities suppress or limit their "need" for disability services to avoid labeling. I.E. a visually impaired person will not use a walking stick.*

4. How does the current on-campus transportation accommodate people with disabilities? Are there different challenges as the seasons change?
   a. *MIT Facilities works with people with disabilities to ensure their paths are clear and accessible. Students send in the routes they take so that MIT facilities can make these routes more of a priority.*
   b. *They also ensure all future orders of campus busses are wheelchair accessible to avoid segregation of people with disabilities. Creating separate vehicles highlights the disability of that person. MIT bus staff should be trained to handle wheelchairs as this has been a problem in the past to where the bus driver doesn't know what to do in these situations.*
   c. *Work with the city of Cambridge to recognize where students live and need accessibility during winter months. Snow plows can cause disruption to walking paths, doors, etc. Snow plows can unknowingly reverse the work of MIT facilities.*

5. What do you think is the most difficult component for most students, faculty, or staff members with disabilities in regards to transportation around campus? What do you feel their biggest needs may entail?
   a. *Students with disabilities can share their common travel paths to allow city and campus construction and service organizations to ensure paths are usable for travel.*

    i. *MIT facilities provide updates to students with disabilities for future and current construction and work around campus. It gives them a heads up that their path of travel may be impacted so give students extra time.*
    ii. *There are services for students to work with for improvements to campus locations etc. They will typically take a photo and submit their request through the Disability Services center.*
    iii. *Students must speak up when encountering a barrier and this can be difficult for some students to advocate for themselves.*
b. *Keep in mind the paths of travel and building accessible places for students and faculty access.*
    i. *How far must someone travel before reaching an accessible entry into a building or facility.*
    ii. *Designing the system to meet these needs initially are much easier if done up front.*
    iii. *Harder to retrofit certain buildings because of preserving historical nature, cost incurred in budget or lack of foresight*
    iv. *Accessibility features being blocked, misused, or inaccessible. Building outside doors are automatic but secondary doors inside are not. People locking bikes to hand-rails that are needed by some.*
c. *Develop transportation systems that will update the status of travel methods electronically and locally via audible and text-based updates.*
    i. *Develop a system for the visually impaired to describe which seats are open on the bus, train, etc. and ensure stops are clearly announced at arrival vs. a typical intercom system.*
d. *Avoid creating tension for people with disabilities*
    i. *People with disabilities are critical to diversity and inclusion, so if these are goals, then people's disabilities should be prioritized.*
    ii. *MIT may opt to go above and beyond inclusion efforts instead of meeting regulatory minimums.*
    iii. *The Americans with Disabilities Act specifies minimum criteria for accessibility, but the minimum standard does not meet the expectations of many with disabilities.*
    iv. *Marketing materials for implementation should include people with visual disabilities for inclusive adoption.*
e. *Transportation system MUST accommodate deaf, blind, and mobility limited people. Sound, Words, and accessibility.*

<u>Secondary Questions (if time allows)</u>

6. Were there any transportation projects that tried to improve accessibility in Cambridge that did not achieve their main purpose?

    a. *Rental electric scooters were proposed at one point in Cambridge but were quickly shot down.*

7. In your opinion, what are the highlights of Kendall Square?
    a. What services (if any) do you utilize?

8. What should we be sure to not change
    a. Maps currently show updates to roads with construction or changes to accessibility.

9. What are the biggest complaints from people (in general) using the MIT transportation system?
    a. *Construction makes getting around difficult for people with disabilities.*
        i. *It alters the path of travel, modifies curb cuts, and changes the general understanding of location for visually impaired and people who rely on habit.*
        ii. *This can cause people with wheelchairs to go into the streets, severely modify curb cuts, remove general color coding for people visually impaired, create uneven surfaces, holes in the pavement, rough spots for people using walkers, wheelchairs or walking challenges.*
        iii. *Changes in travel path can adversely affect people with specific forms of autism or OCD.*
    b. *Unable to receive live updates on status of busses, trains etc.*

10. Could you describe transportation systems that you've experienced in other universities, cities, or countries that would be useful at MIT?
    a. *EZRide was a positive form of transportation due to the friendliness and openness of the operating organizations. The transportation system was also free for companies and institutions that supported it.*
    b. *There was a bus that would always operate to get students into Boston on Mass Ave. This bus is no longer operational, and the normal bus sometimes will not run during busy events or baseball games.*

11. Are there any other useful resources that you suggest we follow up with to learn more about disability transportation requirements?
    a. *American Disabilities Act*
    b. *MIT Transportation Surveys*
    c. *City of Cambridge Executive Director and ADA Coordinator*

Head of Government and communication office at MIT

Transcript for the interview with the Office of Government and Community Relations at MIT (OGCR) representative.

Interviewer

So, we wanted to first like talk about the role of OGCR (Office of Government and Community Relations), we have read on the website, but we'd like to hear more from you. What's like the role of the office in supporting transportation projects at MIT?

Interviewee

Right. So, our office is really, well, every university has an office like ours, it can be called by different names like public affairs, public relations, community relations that sort of thing, you go to any university, and you'll find it, small, big, you know.

So, we are the Office of Government and community relations, there's of us all together, our primary responsibility is to serve as liaisons between MIT and all three levels of government, and particularly the Cambridge community.

You guys know that we have a Washington office? and so the Washington office is the primary conduit to the federal government, but we provide support to that relationship, we have some state relations, but really the bulk of our work is with Cambridge. So we work with Cambridge legislative bodies to city council the planning board.

The board is on and appeal the license commission the historic commission, and all the community neighborhood associations, civic associations, you know, residents.

So, it's the full relationship between MIT in Cambridge that we focus on it that's my primary responsibility as co-directors, overseeing that. So, as you can imagine the topics range from, you know, social services, you know, providing care to on house individuals or families living in poverty or whatever, you know, might be needed in that regard to economic development to sustainability and to transportation, I always list, transportation, as one of the major topics; are themes that fall within our responsibility and it's been that way since, since I arrived in I've been here for years, so, transportation is a key topic and it's evolved over the years. Obviously, you know, today, what we think about in terms of transportation is, you know, is the T running as efficiently as it can. How can we influence it you know it's improvement, if we think if MIT is providing enough transportation benefits to its employees, so that we can get people out of their cars and onto the subways and buses or whatever it might be.

Are we working together as a community? you know, strongly enough? and I mean the Kendall community, to make sure that the state is providing the funding that's needed to the Department of Transportation for highways, you know, shuttles bridges, whatever, you know, we might need to do so. It's both an internal and an external focus and our office plays a role in that, we don't lead it, we play a role in it, and, you know, I can talk through it, you know, what some of the other stakeholders are.

Interviewer

Yeah, that'd be really great, to understand the whole system, like, can you describe like what other organizations that you interact with and, like, when you play it internal versus external role like, how does that organization or how does that structure kind of work in overall?

Interviewee

Yes, right let me do that in two ways. So internally first. So the folks who worry about and think about transportation, are the, you know, our office, the Office of transportation, this is Tom Giannino you guys are probably most familiar with them, they're sort of the public facing, you know, that's where you go to get your, T pass, you know, your Atlas, you know, all that kind of stuff so planning, transportation, and then the mid-tempo The Real Estate Group, Adam at tempo works very closely on transportation issues that might surprise you, but like, for example, right now. The Real Estate Group is completely reconstructing that the Kendall head house on our side of Main Street as part of the Kendall Square initiative, a project that you've seen going up maybe, any of you guys live at site?

Interviewer

I live at senior house, but I can see them.

Interviewee

Yeah, okay, so the Real Estate Group, planning, transportation and the Real Estate Group. And then we come together in the institute's transportation and parking committee, are you guys familiar with that? That's worth looking up. So, I don't mean right now but just, you should have an awareness of that. This is a presidentially appointed committee that, let me just pull it up for a second, okay, I'm just going to share my screen for a second. All right. ***Interviewer*** Sure.

Interviewee

So, um, So this is, this is the committee for transportation and parking, and you'll, you can see that it's made up of a mixture of staff and faculty It's chaired by Joe Hagen's who's the Vice President for, like, operations and stewardship, you can look him up.

These are the faculty members, you know, right about here. And then we have students, and graduate student and then all the rest of us, our staff, and the, what I think is important about this and all I did by the way was just put in MIT committee on Transportation, so you'll be able to find this easily, but it gives you a sense of the breadth of involvement on transportation issues. You know, student life, human resources, the provost office, deeper and, you know, etc. Government Relations, planning, real estate, so I'm going to close that out.

And, but that I think, that's the umbrella of oversight around transportation issues and again that shows you the breath of involvement, transportation is just not a little issue that one person, you know one office takes care of.

So, internally we come together, in fact, we meet today at one, that group is meeting today at one.

Um, so I would include that in your presentation just to demonstrate that you understand the hierarchy and that you know the overarching sort of sense of responsibility around this issue.

So, I'll just give you an idea of something I'm going to bring up today. The meeting is just an example, so, the City of Cambridge is wanting to help buses move more efficiently from Memorial Drive through to central square on mass ave., if you guys probably all know you can sit there for a long time. Right. I don't know if you drive or if you take the bus, you can't get through there quickly on a busy day. And so, the city has tried previously, to try to create dedicated bus lines, you're familiar with those, and the last time they tried it, it just didn't work well, it was confusing to drivers, there was still congestion, it didn't work well, and the city is very experimental. It's not a, it's not a bad thing, that kind of failed. it's just how, what they do, it's sort of interesting.

It's kind of like MIT, you just try and try and try, right? So, they're back now with a new plan, they've done an analysis, and what they're suggesting is that if you're on mass ave. headed towards central square, there, they are going to remove the left turn on to Vassar, there you with me?

Interviewer

Now this was in New York City. Right.

Interviewee Say that again.

Interviewer

That's very similar to New York City or is it?

Interviewee

Yeah, there's no left turns. Okay, so that is a very serious left turn for us, right? You know, like we won't give up that left turn easily, that, you know, that's taking you down to the new undergrad dorm, to the new grad dorm, you know, to, you know, in the future, I mean, right now it's not like such a big problem, but in the future, we're going to be developing more in West Campus. Once you lose a left turn, you don't get it back. So, we were quite reluctant to give up that left turn, not that we own it, we don't but worse, we are the major stakeholder for that left turn. So, the city was kind enough and it's the nature of our relationship for them to reach out to us. So, what we do, we do what you do at MIT. We took their data, and we hired somebody else and we did a peer review, and the peer review demonstrated that if that left turn was removed, we really will see progress through that cross section.

The buses really will be able to move, so, we agreed, we supported it, and we said, in the future, when we're developing West Campus which is like / years out, you know, all of us we're not going to be here will be retired, you know, we just want to flag and sort of reserve the right to revisit that left turn, and that was agreed to, so, it's just an example of how we work on the transportation issues, so, back to your question Bryan, now, externally, the people that we work with are primarily the Kendall Square Association, which has really played a significantly visible role on transportation and it's, I would recommend that you check out some boston globe articles about this, the KSA has come to be viewed as the sort of the expert on the pulse of transportation needs and challenges, and you'll see op-eds by the presidency, a web.

You'll see reports in, also go on to the KSA website.

They, they have this initiative called transportation advance, and the idea there is to teach people about new technologies and transportation to, you know, compel and encourage people to try different modes, and it’s not unlike MIT, you guys will, you know, remember a few years ago we had a whole, you know, “switch up your mode challenge” you guys remember that? Or were you here? and if not, that's worth looking at. It's, you'll see that you can even, I mean, if you like, we can see if you can find it on the transportation department's website, MIT transportation department's website, If you can't, if it's not there for some reason, just kind of Google around with “switch up your mode”, you know, “MIT” you'll feel ultimately find it, and it was a campaign where people were like saying, “Hey, I'm trying this new thing” you know, and “I'm trying this and” you know, so trying to get people think a fresh about transportation. So all that, you know, we were doing at MIT, and the case a was doing, we also work closely with the city's transportation department, the head there is guy named Joe bar, and I probably talked with him three times a week about various transportation issues, we, we try to be really in sync

with, with the city, transportation is such a serious issue that we can't afford to be out of sync with the city, you know, we need to work collaboratively with them, and I just described the process to you were we were concerned about something that they were and, ultimately, we agreed with it. That's what we like to do, that's what we try to do if the facts are there work for it, you know, so, externally we work with the KSA.
We also work with a Cambridge Redevelopment Authority because they own a lot of property and Kendall Square, like I said, we work with the city, and then there are several different shuttle programs, you know, that that kind of come and go that we stay in close contact with the idea to understand the whole, you know, Kendall squares, a problem right now, right? you can't, I mean, it was going into covid It was a part you couldn't move, you know, people don't want to drive anywhere they want to come, you know, some people, well, some organizations were moving out of Kendall because the traffic was so bad, you know, you'd sit at an intersection for minutes and, so, you know, then covid came. And, you know, of course there was like no traffic for a year and a half, and now it's really kind of back, you know? it's even though not all the employers are worried they're going to be exposed to the virus. You know, I think that's the main thing, and because there aren't other things that make sense you know, so, so if you're frightened to ride the T, then you're going to bring your own car right? and that's an SOV, a single occupancy vehicle, you get a lot of them on the road, you know you're going to, it's going to be congested, so we pretty much think that's the main reason.
So you'll see these campaigns by the T and others that are like the "T is safe". "The T is wiped down every day" you know, just where your mass there, there's the least incidence of virus transmission on, you know, on the T you know that I've seen all kinds of campaigns and just trying to get people back on the T, and then, did you see what MIT did?
We decided to get people back and commuting again, we provided an increased subsidy, these cards , it's all built in, what an incredible benefit. I can ride anywhere anytime on any subway or bus. And then, we increase the benefits for the commuter rails. Did you guys hear about that?

Interviewer

What we noticed from the boot camp was all the transportation was subsidized, and it was big. All right, It seems like SDM is really big, but I didn't connect the dots to this reason. There are a lot of benefits.

Interviewee

Right? And it's amazing.
But there was a point to increasing it, September th was supposed to be the big day that we all came back (it was different for graduate students), but for us employees that was the big day. And so MIT announced that, basically, whatever you do to get to MIT, it's going to be paid for. And the idea was to get you on that train, ride the train, so we don't have this horrible traffic. And we're still sort of waiting to see all the results. You don't really have to analyze it to know that if you're stuck in traffic, it means we're not riding the train, so that's an ongoing challenge.

Interviewer

You mentioned something that to me is interesting. We had in the Cambridge area in Boston general, all these modes of transportation - buses, EasyRide, all that you mentioned before covid. Were people happy about the current transportation? Were you personally happy about these services?

Interviewee Yeah. Good point.
So I would say, people were generally unhappy about the red line, and the unhappiness came from overcrowded trains and a frequency that people didn't generally feel was adequate. So, the crowd would get really deep on the platform but then you might not even get in the train. And so, there was general unhappiness.
And the people were unhappy about the condition and age of the red line cars.
For a long time, we were trying to pitch to the governor. When I say we, I mean like all of us in the Kendall Square community, such as the KSA, MIT. We get everybody together, let's send a letter, you know, to the governor saying please allocate funding for new red line cars. And he said no no no no no. Now he's a republican governor and that's typical for a republican governor.
The Democratic governors tend to be more supportive of transportation. So, that did not surprise us. But we stayed at it and again we, all of us here in Kendall and, ultimately, the Governor did commit significant funding to build new red line cars. They're not going to be online for a couple of years but at least that took place. But then there are other issues, like, if you go to some European countries you go, you get on the platform, there's an indication of where you're supposed to stand. And then the train comes, the doors open, It's so precise.
In Japan, in some other countries, you walk in, people are walking out. It's so organized. It sounds ridiculous, but those seconds turn into minutes turns into hours for systems that are not organized. There's been a lot of criticism and recommendations that the State look at what's going on in European countries in terms of precision and efficiency. I think our culture is less likely to act like that, so it's a harder sell on that. So, there was unhappiness about the red line pre-pandemic.
Interviewer
That's great. Looking at currently, and in the future, and assuming things improve, when we're thinking about this, we don't factor Covid in the equation. Just out of sheer optimism in life in the future, aside from building carts for the new train, what would you say are the main issues in the transportation systems?
Interviewee
Yeah, I tend to agree with you. I think covid is going to become less of an issue for a few reasons. One is that people are going to get their boosters. It's going to become an endemic rather than a pandemic. And then we're just going to get our shots every year and it's not going to happen overnight, but I believe in the coming years that
Covid isn't going to be the challenge to transportation as it is now.
I think the other reason is that some of the older people who are most vulnerable will be retiring and deciding to leave. It just was too much. So, I think we're going to sort ourselves out, and so I agree with you to not include that.
So what are the challenges? You see all the building activity going on? MIT by itself is in the process of building six new buildings in Kendall Square. Two are complete, two are underway, and two are planned for the future. Lab and office.
And then we just got approval for our Volpi project, which will have 8 new buildingslab, office, residential, retail. And then bio med realty is constructing its new housing right off of Third Street.

The Google Tower across the street from our projects is under construction.
It's a whole new group of people. So, what does all that say to you? It's people there, we will have more people than ever in Kendall. And I keep saying Kendall because that's really where these issues are focused.
I don't know what our pre-pandemic analysis actually was, I think it was 50,000 people that worked at Kendall pre-pandemic. Of course, it went way down.
What is it now? I actually don't know that. And then what's it going to be when all of this is built out? It's not just that - it's more than that too. Optimi just built its new facility on Broadway. The Alexandria Real Estate is building all through Benny.
You've seen all the construction and it is astounding how much lab and commercial. And residential because the City of Cambridge requires residential mixed in with the office in the lab, which is good. no one's done that analysis yet, you know, five years from now when it's all done, what is that?
Interviewer minimum 20% I would imagine, yeah?
Interviewee Say it again?
Interviewer at minimum 20%
Interviewee
I don't even know how to guess. How do you know how to guess?
Interviewer
It is the size of the building. how many of these...
Interviewers
So you have a sense of it. But, we're going to sort ourselves out with covid, and then we're going to increase our population by % or whatever you know?
Interviewee
Yeah, there's going to be demand.
Interviewer
And really, really, really good points because sometimes we, I think, like covid has shifted our attention, completely to work of it in the first some projects maybe we're not thinking of what's coming in the next few years when this pandemic becomes an endemic and this is where we tried to come in, like in terms of transportation.
Interviewee Yeah
Interviewers
What would you say that are other examples of the strategies that are being developed? And also if it's related to the Kendall Square area and the discussion we just had on the population.
Interviewee
Yes, right. I'd say the main additional one is the bike facilities. So you see them all over town now. These are green, they look different everywhere, just depending on the streetscape. But these green lanes, sometimes you see them on both sides, so that bicycles are moving in each direction in their own dedicated lanes. Sometimes they pull the bike way over to one side and the bicycles run in the same direction in the same protected facility. Just depends. It's kind of a riot, you know, so like if you're a cyclist, you come onto the street. Or, I'm over on the left side, so I'm separated and over the right side. The idea is to provide conducive cycling conditions so

more people get on their bikes. And it works. I mean, in my time here, the increase in cycles has changed the way I drive.
Now, when I'm Driving to MIT or anywhere in Cambridge, I have a new way of driving which is to look for the cyclists. It's so ingrained in me now because there are a lot of collisions here you see these kinds of difficult interactions.
There are consequences and so there's actually a big issue in Cambridge. Coming
from the small retail shops because in order to build those bicycle facilities,
parking is removed. So, you can go to stretches of streets in Cambridge where there are these nice lanes. You know it's beautiful, but there's no more parking.
And so, the -year-old person who used to go to the pharmacy and central square, can't go there anymore because there's no place to park and that person has difficulty walking and so there is a backlash against the cycling plan, the cycling Program in Cambridge, because of the impact on residents and on small businesses.
The city council meetings are Monday nights I always watch them so this was a major topic last night, the counselors just kind of Sparring with each other, depending on who their constituencies are, you know, if you represent the cyclists then you're going to be fighting for the bike lanes if you represent the elderly or small businesses, then you're going to be fighting against the bike lanes, so it's interesting.

***Interviewer*s**

Can we watch those? Are they available?

Interviewee

Yeah, so if you go into the Cambridge meeting portal.
And you have to do a little looking but you'll find last night's city council meeting and the agenda, and there will be an item on bicycle lanes.
Tell me if you don't find it, and then you'll come to win that order, they call them orders were taken up and you'll see the discussion and consider counselor Denise Simmons is you know yeah I want cyclist to be safe but what about the elderly. What about the elderly who need to maybe it's right there, that'll be a nice current event for you guys to, you know, stand up all night any way you're gonna, you can take time to go find that and you'll be so relevant because it just happened on Monday night. ***Interviewer*s**
So, just to get a clear sense of the hours and the specific meetings like is already car is actually proposing a solution or is it driving consensus between multiple parties or is, like, are you coming up with like a proposal like what are some deliverables, or what is like the crucial roles in these particular situations or specific situations.

Interviewee

Yeah, great question. So, we don't have any role in the city council meetings, I watch them every Monday night to see what's going on. What are the counselors talking about, there's nine of them.
Our work is fully political, everything that we do is political. So I need to know what the counselors are thinking about, what are they doing, what are they upset about, what do they want MIT to do, MIT had a big Portion last night they were talking about us actually in a positive way.

I watch them, and I watch the Historical Commission meetings and the planning board needs, and the license commission maybe suggests something and if I don't know what's going on, then we as MIT can't respond in ways that are sensible, you
know? that are collaborative
So my role is to make sure I know what's happening, today when I go to the Transportation Committee meeting just as an example, I'll be able to say, the council was really fighting about bike lanes on Monday night or the left turn we're going to go ahead and do it you know or whatever it is, and then later I'll go to a meeting on you know something, another topic, might be on housing and, but I'll know it because I just listened to everything.
We have to have a strong knowledge base in order for us to decide how we're going to interact with the city, whether that's a new Program or response to a new policy, or if sometimes we have to fight against stuff, so we don't have a sense of like the tone and culture around any issue then we will look like we're out of touch, we cannot be out of touch, we have to be in touch.
So it's more about coming up with the messaging and Political stance from MIT's perspective, by now, I mean I like to think of us as the People who roll up our sleeves, yes it is messaging, yes it's a political stance. You guys are problem solvers.
My job is to solve problems. So what are we going to do about “fill in the blank”, I mean there's like a million, every day there's like five or six new things that we have to solve.
What are we gonna do about this, so we have to determine how we are going to approach it, what's our demeanor going to be? What do we want to suggest? Is there a faculty member who's an expert in this area that we could bring to the conversation? We really roll up our sleeves, we're at the table, we're present, and we try to solve problems, that's kind of our approach.
***Interviewer*s**
This brings us to a very interesting point because you already mentioned a lot of issues that are literally sometimes like the way sort of where you want to support one area but it diminishes the other needs. So, in terms of all these issues and challenges that you're facing, How do you know? Because we only have hours a day. And even if you remove all the sleep like we still only have hours a day like how do you prioritize which one to focus on? because, like, what are the metrics that you use to say, all right, we need to work on the left turns right now, versus, all right, we need to get rid of the bike lanes or create more bike lanes like how do you prioritize those?
Interviewee yeah, I love it that you're thinking like that and you've asked that question. So this will sound corny but here's the truth. We're guided by MIT's mission. So whatever MIT is doing is what we're doing. So if we're trying to get the Schwartzman college approved, which isn't an intense process of permitting and approvals and politics with the city of Cambridge, then we're going to do things we're going to choose to do things that are going to help us get that college-approved. it had to be approved, you know? the general MIT public isn't even aware of this is what we have to go through to get these approvals, you know the Volpe project had to be approved, that Kendall project had to be approved, music has to be approved, met storage has to be approved, the grand Junction pathway, oh, let's talk about that in a little bit.

So we MIT says, these are our priorities right now, do you know equity and inclusion are today? tomorrow is the values meeting, you know that? like, do you know what I'm talking about? We're doing a webinar on our values. You guys should watch that, so, we're guided by that. We are like sponges, whatever MIT is doing is what we're doing.
So we might skip a topic If it doesn't really matter to us. If it doesn't really impact our future, our aspirations. I mean our job is to make sure that you guys can do your work.
I'm not kidding I'm not saying that to you know for a fact. We are here for the faculty and the students, and so whatever MIT is doing, to make sure you can do your work, then that's literally how we pick and choose our topics.

***Interviewer*s**

I guess I am actually a full-time worker and also attending MIT, but it kind of sounds like how the company kind of envisions up this is our goal for this year and then it kind of comes down, but another just in the corporate world at least, is there is a bottoms-up where we say right here are the priorities or if you're the decisions that are made from whatever community or whatever, leadership, but there's also validation.
So like, how do you make sure that the steps that MIT is taking are also valid, and what is like the fact checks or the data that you collect to make sure that whatever that's being contributed works on to the right intention as well as the right goals that are like you set.

Interviewee

Right, right. So, um that works.
It works both ways. So, all of us who worry about this stuff are constantly in touch with senior officers, I don't mean every single thing that we do.
But, we don't do anything without senior leader approval. And usually, that means that we've presented a plan, so the endowment news came out on Thursday right.
I had a full plan for that, two weeks in advance, about helping that news to land in a way so that people could feel positively about MIT. And, that plan was approved, so there's constant checking up, that's one thing, then the other part of it is, what if MIT's doing something that we think could actually hurt the Cambridge relationship that could present some risks to MIT, based on what we understand of the
Cambridge relationship.
Well, it's the same thing. We are empowered to say that to our senior officers. I'm really worried about this. Can we stop for a moment and think through it? These are some unintended consequences that could take place, and they're there. They're receptive, our leaders are receptive, they hear it, and then often will make some adjustments to the plan or whatever might need to be done so.
So your instinct is that there's got to be some play in there, and there is a lot of play.

***Interviewer*s**

Make sense, just switching gear, and then I want to catch up on one of the things that you said, you mentioned that there were previous attempts on creating a bus lane, which wasn't too successful, like the left turn and all that. So, can you describe a little bit more about that analysis and the conclusion that was made, and why it did not help? What were some success metrics that you used to determine that that was not a successful project?

Interviewee

Well, so it's a city project and you could look up here (first project)-
https//www.cambridgema.gov/CDD/Projects/Transportation/southmassavecorridorsafetyimprovementsproject
You can see that we don't actually do the evaluation, the data assessment, and the metrics the city does. So for us it was more experiential and we didn't get involved in the assessment, except to do the peer review which we did on the second project
https//www.cambridgema.gov/CDD/Projects/Planning/KC

Interviewers

When you talk about the deliverables, I'm guessing there is a lot of approvals and a lot of meetings that you have to go through. How do you measure the success of your work?

Interviewee

Yeah, that's a good one.
So, one measure of success is whether we get the approvals, right?
And we always got approvals, because we are in touch with the city. We understand our involvement. We have the foundation of knowledge. We do take our responsibility seriously as a good citizen of this city and we are committed for the betterment of the city.
There is $9 billion gain in our endowment. This Saturday we're having the MIT Volpi block party. The whole town is invited, where everybody can come for food and music. And, you know, what's a measure of success? We haven't gotten raked over the coals or the endowment, There's a long list of those little measures of success. It's because of our demeanor.

Interviewers

Yeah, it kind of reflects. I'm a software engineer, and every time I use any free open source code, there is an MIT license.
So, one of the last questions that I have is, once you get the approval, is there any sort of inputs that you had take to make sure that people go successfully, or
Is there any sort of pointers or mandatory inputs for upcoming projects that you know would help getting approvals?

Interviewee

Yeah, I gotta show you something [Refer to Appendix
Okay so,you can find a whole bunch of Volpe articles that summarizes the entirety of the project. Now the reason we did this a week ago is because of the pending endowment news. So, the city of Cambridge is going to learn that we just made $9 billion and the capital campaign that just ended made $6.3 billion. So, if I were City Councilor in the running for election right now. MIT just made $15 billion. Then I represent the people of cambridge many of them live in poverty. It's like a candidate's dream.
So, we have to put together a whole campaign of how to provide good information to the public, to the counselors, before and after the endowment news. That's why we wrote these articles. Its so called article process which is essentially the master plan. Now we got zoning approval, we're going to move into the design phase. How did we get those approvals? By providing community benefits, strong Equity and Inclusion practices and ample open space as you can see.
We created a Job connector for Cambridge residents. It's a huge one. These are the benefits for the community. Affordable housing Trust, Community Center, $8.5 million for transit

improvements, $8.5 millions for non-profit organizations. We conveyed our land and gave $8 million towards the Grand Junction Community Path, a railroad corridor that runs through the MIT campus along Vassar Street. We're going to turn that into a community path. It's a commitment that we made to do the
Volpe project.
There are many such examples. We ran seven workshops Focused on the Community Center, retail employment, youth nonprofits, open space and housing with 500 members of the Cambridge community in attendance. To gather up what we needed to hear and know from the community. As regards to the Volpe project we have a whole PowerPoint of everything that we learned and what we're doing about it in terms of the Volpe project, and you can see its ranges, you know every element of the plan was touched by the process.
How can housing be operated in an inclusive way? How do we celebrate diversity in retail? How can the Job Connect your help residents with employment?
How does the open space feel inclusive? It's that kind of stuff we looked at DEI through the lens of all these specific topics and came up with a framework for DEI and Volpe. So, it's just an example, to answer your question. Every project we have Extensive community outreach and input sessions with the public. You guys can find this article if you're interested.

Interviewers

Yeah, I already looked at every lead that you shared and got all the links. I think that's pretty much all the questions that we had. Is there anything we might have missed asking you?

Interviewee

I guess one thing I'd say, to me, transportation is not a standalone issue it's not in a silo. It's Connected to sustainability. Equity and Inclusion, innovation, economic development. These issues are all connected. Transportation is not a standalone topic. You don't just work on transportation, you take all these other topics that are so important in today's society.

Interviewers

Yeah, we can definitely correlate that this is a complex system that includes multiple stakeholders and multiple beneficiaries. And that's a really very complex problem to solve. So, I'm really excited to hear all the stories that you shared so I really really appreciate your comments as well as information that you had.
And obviously, this is something beyond the experience of our assignment. I really appreciate your time and input to us. Thank you.

Interviewee

Well, it's really nice to talk to you guys. I wish you the best.

Interviewers

Thank you. Goodbye.

Appendix

Current surface transportation methods: http://web.mit.edu/facilities/transportation/shuttles/
Regarding Private car and parking: "*Please note: MIT is committed to helping the City of Cambridge reduce atmospheric pollution and traffic congestion, and we work with the City to regulate and restrict the number of on-campus parking spaces per Cambridge Municipal Code 10.18.*"
Current MIT supported surface transport methods:

Biking, public shuttle, Car (Vanpool, ZipCar, Private), Walking
Here is a map for accessibility: http://web.mit.edu/facilities/maps/mit-accessibility-color.pdf
Committee for Transportation and Parking
https://facultygovernance.mit.edu/sites/default/files/committee-membership/Transportation%20and%20Parking%20Roster%202021-2022%20as%20of%20 20210816.pdf
Volpe Project https://news.mit.edu/2021/volpe-project-prepares-design-1007
Kendall Square Website - Transportation https://kendallsquare.org/transportation/

MIT New Front Door Representative

***Interviewer*:** One of the first areas that we were unclear on was how IHQ fits into the overall picture. How does the new front door fit into IHQ and where does the charter come from?
***Interviewee*:** Going back to 2012, there was a faculty committee. The voice committee on innovation, entrepreneurship, and it identified gaps in the MIT innovation and entrepreneurship ecosystem, one of which was the lack of a large-scale piece of infrastructure that can physically support the collisions and interactions of people and provide a home for the innovation ecosystem.
Back in the day this use to be the radiation lab. It is famous because all sorts of things like radar was invented in there and Noam Chomsky's linguistics theory, and the building was such a piece of junk that grad students can literally cut holes through the walls, and was famous for being the place where all of the misfits of MIT ended up that and people that didn't fit anywhere else would fit into the Rad-Lab. And it was kind of the catch all, and it became this very famous place of lot of creative energy and productivity.
It got torn down and now there's a recognition that is now missing from MIT. So, the last couple of years we've been designing this building to be the new physical home for MIT's innovation community. Part of the thesis of that ties to the fact that incoming students from other schools including MIT; specifically identify the ability to start a startup, as part of the reason for choosing MIT versus Harvard versus Stanford. The location of the innovation headquarters is right on top of the T-stop, but it's also now right on top of MIT's new Welcome Center, as well as admissions. So that means that the 50,000 perspective incoming students and family visitors that come every year, the first place that they are going to come to is the Welcome Center, and they're going to immediately have a touch point to know that this is the innovation headquarters and it is the front door to innovation at MIT. This isn't merely the front door, you can come here you can get some resources, you can explore out into the campus, but then you always know you can come back here and have a community.

Interviewer: The idea makes sense, iHQ as a building, makes sense because I think the way I read it in the website is you have a collection of different offices and organizations that are here. What is IHQ as an organization; does it sit in building 10; where does it sit in the landscape?
Interviewee: The Innovation Initiative was created about six or seven years ago as an extension of the faculty committee. That came from a charter from the president. You can read that charter online. Then institutionally the Innovation Initiative sits directly under the provost. So, if you're trying to think about the structure of the university; there's the corporate board, there is the president of the university, there's a whole bunch of different people that report directly to the President, the Executive Vice President for Finance, the Vice President for Research, the Provost is one such of those people, and the Provost is in charge of all things having to do with the schools. So the Provost sits above all of the deans of all the schools. We report directly to the Provost. A part of MITII's charge was to design and implement the new innovation headquarters.

Interviewer: Is 77 Mass Ave still thought of as the front door to the university as well?

Interviewee: So there's a whole lot of building development that has taken place over the last several years on Kendall Square. And there's another 10 year plan for the rest of the campus that's being developed. Now the infinite corridor is never going to stop being sort of the circulatory system on MIT, especially from an undergrad and engineering school perspective, but having this building and all this new development in Kendall Square is intentional in shifting, maybe the center of gravity to unify the campus as a whole so that it's no longer Sloan as an appendage and West Campus as an appendage. In terms of the literal front door, the dorms are still over on that side of campus. So it's more of a front door for "whom"?

Interviewer: When you start to get involved with the front door aspect when you're welcoming folks, does that impact some other part of the campus when you're shifting the center of gravity? If so, what organization would that be?
Interviewee: Yeah, the first floor is the Welcome Center and it's run by open space. That will be the literal front door for all prospective and incoming students and faculty. In that sense, it is literally shifting the front door from that side of campus to this side of campus. That is as much driven by transportation infrastructure as anything else. It will be (the) welcome center, admissions, and IHQ.

Interviewer: Are there other buildings or groups that are responsible for creating that front door, the welcoming presence, and so I was just trying to fully Scope if there are other stakeholders involved?
Interviewee: You might start parsing out different stakeholders and different audiences. In terms of the general public. This is the "front door;" it's on top of the transportation hub. In terms of prospective students or prospective faculty and their families; this is the front door; it is quite literally named the Welcome Center. It is intended to welcome all newcomers. But that's not to say that there are not many other doors or many other entrance points for different types of people, especially once you're inside of MIT, where you wouldn't come through the front door, because you're already here.

Interviewer: Regarding general public and prospective students. How is the existing situation meeting the needs, the goals and initiatives in terms of providing transportation? Starting with the current students, are they getting where they need to be going without issue? And I understand they're also competing with construction, they're competing with the general public, and it's getting more and more crowded every year.
Interviewee: I don't think that there is a fact-based answer to that question at the moment because of covid protocols. This building is open in the context of covid protocols, and I don't even think that normal admissions tours are running. Nevertheless, this was a very data driven set of decisions that were over the course of many years, and the T stop is in the process of being reconstructed. So I think on an analytical predictive basis the answer to the question is certainly; this is designed to better optimize the flow of people from a transportation perspective, but I don't think we have the data to back that up.

Interviewer: You did have a forward-looking take on what you are going to need for capacity. What is the vision for capacity, or what would it have been today without COVID?
Interviewee: The baseline volume of tour guests, out of the Welcome Center is about 50,000 per year. That's the pre-growth number. That is just prospective students, families, and faculty on tours, out of the Welcome Center. That number will certainly grow to something more like 70,000 within a very few years. It's also more seasonal; it's not homogenous over time. The T-stop is among the top three most trafficked T-stops. It gets about 1.5 million turnstile taps per day. And then there's a big question around the tour buses and the city buses. There's a question whether or not the tour buses would start dropping off in in Kendall Square right in front of 292 Main Street. There is a new parking garage, Hayward parking garage. So, again, in terms of transportation capacity, this site has been designed to absorb and become more that center.

Interviewer: So, all things considered, what's your utopia, in terms of how the Welcome Center is going to operate in the space you're going to have?
Interviewee: Every space in Kendall Square redevelopment at large sort of answers that question in different ways. The open space area just outside this building has been specifically designed and permissions implemented to ensure that the broader Cambridge community, as well as the general public, as well as the MIT community can access it and can utilize the various event features that will be taking place there. For example, Black Panther was projected last week, and it was open to the Cambridge community. So that is part of a larger endeavor for MIT to engage the city community; those that have traditionally not felt welcomed or have not been welcomed onto the MIT campus. As you move through the buildings, they are very explicitly targeting other audiences. The Welcome Center is acting both as the Welcome to the general public, as well as the station house for access to admissions and prospective students, as you move through the IHQ, it thinks about different stakeholder groups. The first the first floor of the IHQ being targeted at the general student body especially undergrads and especially those with no background or experience in innovation. Then as you move up in each floor, there is a gradient, where the target audience becomes a little more sophisticated a little more experienced in innovation startups and entrepreneurship.

Interviewer: Regarding foot traffic, and the ability to direct the ship from a foot traffic or access perspective. Is there any budget, or charter that you are expected to do, or is it a little bit more of a lobbying side with regard to campus?
Interviewee: The Kendall Square redevelopment. More broadly, and all of these thinking about urban planning level, or landscape architecture level questions. Sit with someone else.

Interviewer: If I'm a prospective student and showing up for the first time, what is your vision of that utopian experience? I show up, what do I see first? How do I orient? Where do I go? What do I do? Who I talk to?
Interviewee: It's an interesting question because the Welcome Center conducted a lot of interviews and analysis around what message it wanted to project to actually exactly the answer that question. One observation is there is an expectation that people that are interested in coming to MIT, or that are applying to MIT already conceptualize MIT as this place full of

engineering and science and smart people. It turns out that that doesn't need to be something that gets communicated as part of the welcome experience.
Moreover, for those that are already here, a lot of the building infrastructure that has existed for the last 30 years have been viewed as outdated unfriendly, cold, sterile, and gray are the sorts of words people use to describe the experience of MIT. The Welcome Center explicitly is designed to project more along the lines of warmth and creativity.
We are looking to help people access community, a human community. People don't come into MIT needing to be explained that they're going to come here and be able to do smart things, but people do need a little more access and understanding on the warm and friendly and creative culture and community that does exist here, but isn't part of the external projection to the outside world. There are a number of design theses on this topic at MIT.

Interviewer: What would you like to see done with regard to transportation in and around MIT, that would support the needs of your organization?
Interviewee: I haven't seen the analysis on bike share from the west side of campus to here I know that the blue bikes across the street, and just down the street in front of the coke building are extremely heavily utilized. But I think it's a pretty one way it's more commuter driven. I think the biggest lack is making sure that essentially from undergrad dorms on the west side of campus to here. That's a 15-minute walk, and that might as well be in China. So if there were ways to really constructively ensure that students felt comfortable being able to jump on a bike and get here, that'd be great. And then the tunnels do not connect all the way to MIT medical. We are not connected to the tunnel system, but students do like to use those, especially in winter. Also the tunnels are super confusing if you've ever watched them it's worth doing it, people that know how to use them can like literally get anywhere.

Interviewer: Is there a need to separate traffic such as foot traffic, buses, etc?
Interviewee: I don't know of any endeavors that conceptualize differences between the student body and the public at large in terms of transportation, except maybe shuttle vans. I guess, if there were East Campus West Campus shuttles for students only, that could nice.

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Parking and transportation

Beginning of Stakeholder Interview transcript (conducted on October 19th, 2021)
Interviewer 1: We just want to ask you a lot of questions about the current status and hopefully future status of parking and transportation around MIT. So first and foremost, we'd just love to know what your role is in the department.

Stakeholder: I'm the operations manager, so I'm the boss. We handle everything that involves any type of parking, transportation, MBTA (Massachusetts Bay Transportation Authority) subsidies across campus. And what group do you represent?

Interviewer 1: We are students in the graduate SDM program, so it's the system design and management program, and we're doing a project analyzing the current needs of students and anyone really in the MIT community. And we're trying to come up with possible solutions for the future or just kind of analyze the overall situation.

Stakeholder: Thank you.

Interviewer 1: Does the Parking and Transportation Department MIT focuses on the Greater Cambridge community area around MIT or specifically just the MIT campus?

Stakeholder: We're specific to the MIT campus as a whole, but we do have, for instance, a grocery shuttle on Wednesdays and Saturdays that goes off campus. Our on-demand service at night goes off campus, mainly to assist with the FSILGs, but does have a wide variety of stops off campus that we can do. Although we don't take residents on the shuttles, we do provide service to MIT students and employees in and around campus.

Interviewer 1: How many different alternative forms of transportation, et cetera, would you say you guys offer?

Stakeholder: We have we have the shuttles. We have our [MIT] shuttles. We have the EZ Ride shuttles. We have subsidies with the MBTA. We have emergency ride home services.
We have subsidies with blue bikes. We have subsidies with rental cars.

Interviewer 1: Gotcha. Lots of options.

Interviewer 2: Do you feel like all those options perform in their intended purpose equally well or are there some that the community finds to be better performers and others lacking?

Stakeholder: I find that the MBTA, especially for students with a 50 percent off the rack rate, is very popular. Students are taking advantage of the MBTA passes this year. We have a lot of students who are also taking advantage of parking at a subsidized rate.

Interviewer 1: You shared that the MBTA is most commonly used. Which one do you think is working the best? Would you say that's also the MBTA pass?

Stakeholder: I think the MBTA Pass is working the best, and really our shuttle service has done very well, especially our on-demand program, which basically runs from 11 p.m. to 2:30-3:30 a.m., depending on the day of the week. It just allows for late night commuting more like an uber type of doing it, as opposed to fixed shuttle stops. We're taking people directly to their residence, and like anything else, it depends on how busy it is how well it lands. We've been having great success with it in and a lot of usage out of it.

Interviewer 2: Is that the shuttle that goes around the campus or are there multiple kinds of shuttles?

Stakeholder: We have multiple shuttles. The shuttles that go around campus during the day are the MIT shuttle, the Cambridge shuttle, and the Boston East shuttle. At night we have a couple of safe rides shuttles that run between 6 and 11 p.m. that have all fixed stops that are around campus, but also go into Boston and into Brookline. Then at night we have the on demand from 11:00 p.m. to 2:30 p.m. We have a geofenced area that encompasses all the FSILGs. So again, we can get people late night back to their areas.

Interviewer 1: I haven't taken advantage of that service yet, but I did download the app. It seems like a very good system.

Stakeholder: Yeah. If you download the transit app, you can literally you can reserve a shuttle, and have it taken whatever you need it taken.

Interviewer 1: What do you see as the method to transportation or what's going to change the most in the next 5 to 10 years?

Stakeholder: What's going to change the most in transportation? We are looking at and very interested in electrifying our fleet. So, you're going to see electric shuttles. That's something I am working on, and hopefully we'll be able to get that going. Electric car
stations. We're looking to do a lot more of those on campus. We are working with the MBTA on advancements that they're going to make with new equipment and new trains. Basically, taking what we have and just kind of making it better.

Interviewer 2: Because, you mentioned electric shuttles. Is there any consideration of bringing in semiautonomous, fully-autonomous shuttles? Especially if they're kind of operated in a more closed setting around campus?

Stakeholder: Someone had mentioned that to me once before. We looked at something like that. We haven't gone there yet. It's definitely not out of the question. It could work with some of our smaller areas like a shuttle route or something like that, but we haven't fully examined it

yet. We're right now kind of working on the electric. It's a very interesting idea. I think it's very cool.

Interviewer 1: As far as the electric push, does the MIT department have specific goals they're trying to meet for sustainability or is it just "it'd be good if we could"?

Stakeholder: We have an actual goal to have a fully electrified fleet by 2026. I've already started work with the company on looking at infrastructure costs and shuttle costs and all this kind of stuff to see how and when we could do that.

Interviewer 2: Where who sets that kind of goal? Where are those types of strategic decisions coming from? Are those from within your department?

Stakeholder: Well, they usually come through our sustainability group. They work with leadership. From there, we create teams to handle different sustainable options, whether it's EV charging or fleet electrification or gas emissions or anything like that. Then we have teams that get together to work on these types of projects with the goal in mind of it happening. It's not one of those things that we're just looking to look into. It's one of those things that are foremost on our mind to make happen.

Interviewer 1: I should have asked this earlier, but just how big is your department at MIT?

Stakeholder: As far as people are, there's only 3 actual MIT employees. We outsource our parking and transportation employees out to a company called SP+. We have about 30 employees with them. These are these are the folks that are driving the shuttles, manning the parking lots, driving around with the enforcement vehicle, and basically maintaining the parking procedures. It's basically just me, Dave, and Robin, to handle things.

Interviewer 1: Absolutely. So 2026 fully electrified fleet is one of your goals. Are there any other significant quantitative goals you guys have that you're working towards at the moment?

Stakeholder: Well, we're looking to increase the amount of electric vehicle charges that we have. By the end of the year, we'll have 138 on campus. We're looking to get up upwards of 360 of them by 2026, depending on the need. Obviously, we'll monitor the need and see how things go in the future. Again, like I said earlier, working with the MBTA, the MBTA has a very good program, but it's a little bit old, and it doesn't allow for some things that would like to be able to do, like access for students to be on the MIT ID as opposed to having to purchase a separate card. So there's a lot of things with the MBTA that we're working on to try and make life a little bit easier for both employees and students.

Interviewer 1: When you get these goals and start working with strategies, do these goals come from leadership like the electric vehicle or getting this great access MBTA? Is that something

you guys come up with by talking to students or faculty or how do you set these goals for yourself?

Stakeholder: Obviously you want to keep up with the world and how things are going. You want to stay caught up. There's a lot of focus groups that they work with, such as different student groups and things like that. There are students that work with our sustainability department. We get a lot of feedback from the community. From the electrical car stations, they get a lot of feedback from those people that use the electrical car stations, sometimes with ideas and sometimes as a complaint, like there's not enough available.
It helps to drive our decisions about where we want to go.

Interviewer 2: To further clarify for my own understanding, it sounds like there's many separate groups
at MIT, like the sustainability office or various stakeholder groups. They will reach out to you when they feel like the parking and transportation group could do something to better meet their needs. Or are you in your role or in your group of three people, the ones generating the needs that would satisfy these external people? Are you guys coming up with the idea that you want to be more sustainable internally? Or is it the sustainability office that said, “Hey, if you guys do these things, then you might be more sustainable”?

Stakeholder: It's a little of both because we're all working toward the same goal. As an example, that I mentioned earlier, when sustainability talked about coming up with a plan to electrify the shuttle fleet, that was something that I was already working on. We got together and said, “Hey! We're both in line with the same goal, and that's great. And that's the way we want to be. It’s a collaborative effort.”

Interviewer 1: With these goals and initiatives, you guys are working towards, what do you think the biggest challenges are going to be?

Stakeholder: It really is tackling something new. Let's just use electric buses, for instance. You need to work with things like conditions, heat and cold, how those batteries hold up, distances, and things like that. And we've done a lot of that work already. It really comes down to making sure that we're crossing all the t's and dotting the i's on all the little things that can come with any type of new technology. We want to make sure that if we invest in something that's going to be more sustainable, and it's going to work well for everybody on campus, that we make sure that the day that they come on campus, we find out it's not going to work. It's a lot of research to make sure that we're doing the right thing.

Interviewer 2: When you're pursuing these different goals or just even in your existing operations, how does cost enter into it? Which are the most expensive kind of transportation areas that your department deals with? And then going forward, with your goals for electrification in shuttles and charging stations, how do you get funds to execute those tasks and what does that look like?

Stakeholder: Like most anything, I put together a plan and present that to my manager. We discuss it,
and then it gets presented up. It has to go through, before we go through the transportation and parking committee that meets quarterly to discuss it with them. As a group, we make a recommendation to leadership. Then leadership will then make the decision as to whether to fund a particular thought, be it this year or next year. It's a matter of just putting together a comprehensive list of what is needed and what is what is the goal of it and seeking approval from leadership on it. It's very open to those interested in it being sustainable.

Interviewer 2: In terms of ongoing operations, which of those programs that you mentioned represent the highest costs and which represent the lowest cost?

Stakeholder: The most expensive cost that we have as the MBTA program, because that's a high subsidy that we do for employees and students. It's very well received and very popular. Then after that, I would say probably the shuttle program.

Interviewer 2: Do you feel like those costs generally tracked the popularity of the programs, or are there any that we're paying a lot for that don't see as much utilization?

Stakeholder: No, I don't think that with anything right now that we're that we're paying for is not well utilized. We have had other little things in the past that we've done that didn't work out, and we stopped doing it so we could do something that's going to be more accepted.

Interviewer 1: That make sense. Is all the money through MIT? Do you guys have to assuming some certain amount of collaboration, like with the city of Cambridge? Or because most of it is on campus, there isn't too much interaction with the city of Cambridge?

Stakeholder: No. We work closely with the city of Cambridge. We work closely with the campus planning. There is there is a lot of collaboration with the city, because the city is very interested in the size of our area that takes up Cambridge to make sure that our parking and our programs work well for them. We don't want to transfer any of our issues over to the city. For instance, we want to make sure we have enough parking for everybody without putting people on city streets and taking away from residents. So, we work closely with the city to make sure we stay in touch with them.

Interviewer 1: Yeah, like making sure none of the shuttles are on the exact same bus line or something as MBTA. Very important.

Stakeholder: Because it helps that. If we don't duplicate efforts between the MBTA, the city's own buses, and our own shuttles, it just expands the scope of how far the student can go.

Interviewer 2: If you if you can think of any issues that are kind of affecting a lot of students with the current system as it is. I would imagine you're continually trying to improve the system and would address them. But is there anything other than kind of improvements in the electrification area that you think is a pain point for members of the community currently that you're working to address?

Stakeholder: The hottest thing with the shuttles is dealing with the things that you can't do anything about – accidents and construction. We have apps that live track the shuttles, which you guys probably know for both the day times and for the on-demand. For the most part, they work well. But there's always, issues that may come up. When we had that movie shoot months ago, it affected our shuttles because they were closing down streets or if the city decides they're going to work on something. Then with the on demand, it's making sure that sometimes you'll get on the queue for the on demand and sometimes the on demand will be there right away. Other times, it may take a half an hour before you get there. There are always those little things that you try to make it work is as seamless as possible. It could be a Wi-Fi issue on campus or anything like that. It's just it's just those little things that pop up in what we try to do is work best with the vendors that provide us those tracking services. It's Translink that does our on-demand, and its NextBus that does our day buses. We want to make sure that we're working with them as closely as possible so that when a student or employee want to get the easy ride to go over to the North Station, they can go on that app, and it says the bus is coming in two minutes. I know I can walk over to my stop and that bus will get there in two minutes. I want to make sure that everybody has that ability. And for the most part, we do. But like I said, there are outside interferences that can always mess things up. The system could go down. We could have an internet outage somewhere or any one of a thousand little things. We try to work through them to make sure people get where they need to get.

Interviewer 1: That makes sense that. It's not just a set it up, and let it run by itself. There's a lot of maintenance and in the moment decisions you guys are working through. If you could add any new method or anything new to the overall system, do you have any ideas of things you'd like to see implemented or is it just continual improvement of the systems that are already in place because clearly they are working pretty well?

Stakeholder: I hope so. I think the main thing is, as I mentioned earlier, I really want the MBTA to kind of catch up to us or even the century. They do a great job. They really do. It's not easy, but there's a lot of manual processes that are involved around the MBTA Pass program. It could be so much easier that. There's no reason why we just can't do this all on a cell phone. Why is it every month a student must figure out the service center to purchase a

hard card when this would be something that they could literally order, get the subsidy, and have it available right on the phone? Those are the type of things that I like to see happen, because it is a great customer service thing. I know that you are interested in it, and they want to go with it, but their timeline is more 2023. A lot of these things will happen, but they are working on them now.

Interviewer 1: They have to finish the Green Line extension first.

Stakeholder: They have a lot to do between the new cars and in the Green Line extension and making sure that they're meeting their schedules, especially on the red line. there's a lot for them to do. I take the commuter rail in and for the most part, it works great. But just one day last week, my train didn't show up and I had to wait an extra 40 minutes for the next train. That doesn't happen often, but it happens.

Interviewer 2: So, you take the commuter rail into North Station. How do you get there?

Stakeholder: I'm living in Denver, so I park at the Beverly train station. I take the subsidy of parking at
the station. And then I take the train into North Station. Usually, I walk to campus from North Station, back and forth, because I want to get my steps in. But if it's a lousy day, I will take the Easy Ride, which is a service that we pay for with the Charles River TMA (Transportation Management Association) and that's available to students and employees and that gets you service back and forth from North Station between 6 a.m.
and 8 p.m., roughly.

Interviewer 1: Who do we work with to provide the Easy Ride, the Charles River? Is it MTA or an MIT shuttle?

Stakeholder: Oh no. It's called the Charles River MTA, and it's got its own funding and everything. I'm on the board for that, and we work with Paul Revere. We have eight buses that we provide service for all the members of the Kendall community that sign up for it. So, it's just not MIT. We're a member. That basically provides a shuttle service from North Station up through the new development of Cambridge crossing, up by the mall and into Binnie Street, over to MIT, over the Decatur, and then into Cambridge Port. It goes back and forth all day, so it does provide a lot of help to employees. Those that are coming off the Commuter Rail Association, you get that red line that can take you right to Kendall Square. But there was no way to get from North Station to MIT in the past. So

that's why we have the Easy Ride. Plus, we also subsidize the blue bikes. And as you know, the blue bikes are all on campus and around campus, and that North Station and South Station. You can use those also.

Interviewer 2 How are the amount of subsidies and the parking rates and all of the costs that are borne by the MIT community determined? Is your department trying to break even or is there an allotted budget that you can spend on all these activities? How are those things figured out?

Stakeholder: Everything is budgeted. We've we have our expenses and like any budget, we have

revenues. We certainly don't break even. Everything is budgeted based on history. For the most part, we are very good to budget. Everything that we plan on doing, we are usually right on target. Anything we decide to add, we go through the process of going through leadership and going to the transportation and parking committee to talk about things that we want to do.

Interviewer 2: For example, if you were looking at changing a shuttle route or adding a parking lot or

something like that, would you be expected to be cost neutral where members of the community who were previously utilized in a different department of parking resource could then switch to the new one and there wouldn't be an effect on of cost? Or is that just kind of weighed relative to convenience and positive impact on the community?

Stakeholder: It really it just comes down to the positive impact. If we come up with a new idea, leadership is very open to anything, that will assist and make employees and students' lives easier on campus. And from my point, whatever we can do to make lives easier for transportation and parking needs, we look into. Obviously, everything is approved or not always approved right away. Electrification of shuttles aren't going to happen this year. It's something that's going to happen. But it's a multi-year thing in. Although we do have set budgets, we are able to discuss new ideas and things and plan for that. Nothing is off the table.

Interviewer 1: If it makes the students happy and makes the system better then…

Stakeholder: That's what were all about you know you guys, we want to make sure you are getting stress free, everything beyond what you're doing for getting your classes and your degrees and everything like that, you know there are other stresses whether you're living on campus or commuting to campus that we want to work to alleviate and anything we can do to do that you know is good to help you so you can save the world for our future.

Interviewer 1 So this is very informative and helpful is there anything else we haven't asked that would assist us in better understanding the current state of transportation at MIT and any future improvements that could be made or should be made or just anything you think we might have missed

Stakeholder: No, I mean obviously, the big things for me are better MBTA interface, a back-end
system, really looking at sustainability as it relates to our fleet and growing amount of people driving EV vehicles. What's very important to me is I want to be able to offer as many alternate ways to commute to campus so you don't have to drive. We only have so many parking spaces and we have a lot of people, and we want to make sure we provide accommodations for everybody and in doing so our subsidies are very important to help people come up with different ways to come in, so that is very important to us.

Interviewer 3: I wanted to drill down into your transportation technology evaluation process. The MBTA subsidy, how long has that been available through MIT?

Stakeholder: So that started in 2015 as a part of the access MIT program.

Interviewer 3: So, when coming up with that partnership, what were the criteria that you used to evaluate the efficacy and cost effectiveness of the program?

Stakeholder: Again, the idea of it was looking long term at parking and we knew with the different things happening that a lot of things that build on MIT happen on parking lots and you take away parking when you build a dorm or something because that is the available land. So when we put this together, it was before my time but when that group put that together we know that with 24,000 people on campus we know we aren't going to have 24,000 parking spaces what is the best way to allow for the amount of people to park on campus to 1) have parking available to them and 2) make is so we can incentivize them to come in on other ways. So that is why we put together the whole AccessMIT program, to allow for people to make that change and I'll use me as an example. I take advantage of the subsidy I get from parking in an MBTA garage and a 60% subsidy I get
on a commuter rail pass and if I take the EZRide(shuttle) that's free. For a lot less than the aggravation of trying to drive in and find parking and traffic and everything else you know MIT has made it incentivized me to take the T

Interviewer 3 Are there efforts to reconsolidate parking around campus to offset some of the parking losses or perhaps taking "one floor" flat parking lots into subterranean lots, more condensed, high efficiency lots?

Stakeholder: I have heard of those as potential ideas, I mean right now we try to replace whatever we take away. As you well know spaces as the Kresge Lot, which is about 100 spaces there, now they're (MIT) building the music building and when that's completed, we're going to have a 2-car level garage underneath that will have about 40-50 extra parking spaces.
When we took away all the spaces over on the east side of campus which was the Heyward area, by the medical they were replaced when MIT real estate built the Heyward garage. We are always trying to maintain a certain number of spaces so we can provide for the needs. Maybe what you were saying, you were talking about taking garage space and using it as an event space when needed. I'm not sure if that is what you are talking about.

Interviewer 3: Well, I think, and you can correct me if I am wrong. What I am hearing is that a lot of these decisions come from the fact that MIT is space constrained and parking lots seem to be in, I don't want to say an easy target. But people look at a parking lot and look at it and say "we can build something on this right?" And so I am just wondering if there was some plans to then transform some of these parking lots as they exist now into more highly efficient parking lots. We still have them, but maybe more consolidated into fewer number of spaces.

Stakeholder: Well, if I had my dream, I would build one giant parking garage and just run shuttles
back and forth all over the campus. But I don't think that's going to happen in my time here in MIT. Hopefully, someday in the future. But, to your point, no. In so much as we are looking at new technologies, like license plate technology, we're doing things like that in the garages. And as I said before we are trying so that what we take, we try to replace to the best of our abilities. And that works in conjunction with the whole ACCESS MIT Program, which allows us to have more parkers on campus than what we actually have spaces for. So many people are taking advantage of the subsidies that we

always have parking spaces available but are able to make parking available to more people.

Interviewer 3: What are the questions you ask when evaluating these new technologies? What if I came to you and say, "I think it would be a great idea for the MIT community to have access to UBER credits." How would you go about handling that conversation?

Stakeholder: It really comes down to "is that something going to do with what we already have?" Then we will look at who is that going to help the most? Is it going to assist students? Is it going to assist employees? Because we always get different vendors who contact us with different ideas. If it is something we like, it is something we will bring to the leadership and go from there. That was the same thing for when Blue Bikes first came to us, or whatever they were called when they were green. When they first came to us, they came with a presentation. We saw that it was something that would work really well for on-campus students and for people coming from north and south stations. We get a lot of these and we look at them individually at how they will serve the community.

Interviewer 3: Take Blue Bikes, for example. Seeing that need can possibly be fruitful, did you guys do a pilot or beta program to assess how well it works?

Stakeholder: Yes, we did. We worked with the city and we worked with Blue Bikes. We always start
with the pilot program to see if that is something that people would be interested in. We then take the results and go on from there. In this particular issue, Blue Bikes was a great success and continues to be.

Interviewer 3: Just off the top of your head, if you don't mind me asking, what are some of the metrics that you look at? I would assume it would include how many people are we moving, efficacy of moving, cost, or anything like that that you would take into consideration?

Stakeholder: Pretty much, obviously, cost. We are very data driven at MIT and we have a lot of data we go through. And then we take that data to our different committees and get approvals from there. For the most part, it is data cost and what best serves the community.

Interviewer 3: Awesome! I think that is all the question that I have. I will pass it back to our [*Interviewer* 1].

Interviewer 1: Thank you. Is there anything else we want to ask? I feel that we have a very holistic view.

Interviewer 2: No, I think this was great. Thank you so much for your time

Stakeholder: I hope that I was able to give you information that was helpful. Feel free to email whenever you want and I will be happy to answer any questions.

Interviewer 1: That would be great. Hopefully, we don't have too many follow up questions. We already appreciate you so much for taking the time to come talk to us. This definitely very informative and is going to be crucial in the rest of our project.

Stakeholder: Very good. Good luck with the project.

Interviewer 1: Awesome, thank you and have a nice rest of your day.

Media Lab City Science

Bolded items in green are the team's subjective opinion of the key questions.
Bolded items in blue are the team's subjective opinion of the key responses.

***Interviewer* #1 (D) 0:06**

Let's start with what you guys have been working on. Seeing what you have already done, I think we can probably leverage a lot of them. 30 minutes is not a long me but if we can briefly talk about what you're working on as part of your project. Maybe you don't have to confine it to the campus transportation, but **what are some of the really cool things that you've been working on?**

***Interviewee* #1 (L) 1:00**

There are two things. M, I don't know if you want to give the **overview of the 15 minutes walkable** , or should I? I think you can and **then I can talk a li le bit more specific about Volpe** .

***Interviewee* #2 (M) 1:16**

The group has many visions for the future of the city or a future of urban life. One is this focus on the 15 Minute walkable district. You've probably heard this is important in so many ci es around the world. **The view of the group is that if you create this 15 minute walkable district, you're able to create a space with live-work proximity, access to amenities like what we were looking at in the Volpe table. And by doing that, incredibly cut down the use of mobility, carbon output of the area that we're living in. And in doing so create a more sustainable district.**

***Interviewee* #1 (L) 2:01**

Yep, that's the goal of walkable districts. It is not new but we have been working on this during 20 years. Okay. And the idea is like, we remove the car from the district because during the 3000 years, the natural evolution of the ci es was to have human centric ci es where diverse people are working together and sharing ideas in a close proximity and with a kind of a good density. So that's how ci es used to grow naturally innovation hubs. Then 100 years ago with the American dream and the car, we just started to sprawl out and only in 100 years, there was like a change of mentality, and people started saying, "Listen, this is now how we want to live now outside of the city, etcetera" and then this story made a huge distortion in this 3000 years of evolution. Now is the first me in history where majors are coming to us and saying, "Listen, I want to have an innovation district."

One hundred years ago, the city itself was an innovation district because it was natural. So now we are looking into that and what is missing. So, we are trying to get the best from the past for the future of cities in order to have these walkable districts. The idea is, again, we remove cars, we have local production and local distribution of goods, we have access to housing. That's why we have robotic architecture so we have transformable spaces, not because we want people living in various smaller spaces but because we want to **bring diversity to the neighborhood**. **If you have a smaller space that transforms, then what you can have is like students, young entrepreneurs living with people maybe in another income level so on, and from the data we realized that that brings innovation.** So that's one of the ways to bring diversity to the neighborhood.

Also, we are thinking about fractional ownership. You don't have to pay 100% of your house. You pay 51%. That will help people to come to the district. Then **you need to have amenities such as new mobility systems. Public transportation is fantastic but it's heavy infrastructure and is very expensive. So, we are looking into lightweight infrastructure like the autonomous vehicle that we were showing to you [PEV], that is helping you the last mile.** So that's kind of the new mobility that we are looking at.

Of course, it is electrified, shared, and lightweight. That's the three legs [PEV] where we have robotic architecture. **Then we have this City Scope where we can look into the data and understand the impact of what if scenarios. What if we bring 90% of autonomous mobility to a neighborhood close to the neighborhood?** By doing this as M was explaining, we can reduce dramatically pollution among many other things and we can bring innovation to the district so that's more or less our mission. When we started working with Volpe, it was a more like students' kind of thing with the campus saying that we need to have more participation in the city scope, and in Kendall we have a lot of data from MIT, so we decided to use Volpe. **Volpe is going to be developed by MIT.**

So, we develop the model, engage the developer side of MIT, and we had workshops with them, and we show that they need housing for the students. Of course they have their own agenda and it's very difficult to sell them to change their mentality but that triggers us to say, "okay, now we have to work a lot of with communities, not only with the decision maker, but with the government with the people from the community." Then, we start building our own methodology to have this kind of a governance, where we are building a network, in five different continents now in collaboration with different ci es, and everything that we have learned from working we are trying to bring to the ci es. Of course, when we work with places like Guadalajara Mexico, the challenge is totally different because they have their own problems, their own challenges. That's why we are building a network because the solutions for the US cannot be extrapolated to other places, and that was one of the biggest problems with the American dream. We were selling that dream to Europe, to Asia, to Africa, to everyone.

***Interviewer* #2 (B) 7:03**

We just heard you say, Equity and Equality and also talk about sustainability . One of the questions we had wanted to ask was: **Is the future of transportation just about transportation itself, or is it also about people changing their lifestyle and how they live** . From what I'm gathering from the 15-minute walkable city, it includes kind of changing how we live in it. Anymore to add on that?

***Interviewee* #2 (M) 7:37**

This vision from the group is at times so just overwhelming. But in doing so you give so many things to the community that you're a part of. So yeah, **we always say livable, equitable, resilient city** . I think people have seen resilient ci es being really important in times of pandemic. The way the world wasn't able to shift and adapt. And again like 100 years ago ci es had some resiliency built into it with redundancy that was there. That allowed people to live their lives even if certain systems were out. **The mobility of the future can be much more equitable, sustainable, and environmental if you're looking at this lightweight mobility, but giving people not only those lightweight modes but also a shorter distance that they need to be traveling so that it's not such a burden.** We've talked with other researchers about mobility systems that could work more or less for everyone [like the mom with the kids in the groceries, or the elderly individual or the disabled individual]. **So, the way that they get around the city, but then also giving them the shorter distance to move by giving them equitable housing.**

***Interviewee* #1 (L) 9:04**

Building on top of what M just said, **there are actually two tendencies of thought here. There are people with not only mobility but also environmental challenges. People who advocate for producing infinite energy and guttering the co2 so, we keep our way of living. Other people argue that we have to change our mentality and we have to change our way of living and change everything and almost go extreme side here to the root. The truth is that it's going to be a combination of both.** So, we have to change our behavior, somehow. But it's true that as humans we are also resistant to change. We don't want to change everything because we are doing a lot of things that are working. But, for sure, we

have to change our behavior a li le bit. And at the same me, we need to find new technologies that help us to keep the things that we want to keep in place. The truth is that if we don't balance these two sides, we are going to face huge problems, some of which we are facing now.

Climate change is here, and for sure doing nothing is not a solution. But getting into one or the other extreme also is dangerous, so you need always to work with the people, explain to them. And it's not like an educational thing because the American dream was not an education at all. It's like building a new dream, maybe some global green dream, or something like that, that people are fascinated about. And that's the way. **Make people passionate about living in a new way that is even be er than the way that we are living now. It is not forcing.** If you start looking into data and researchers say we have to avoid cars or if you use a car you have to pay double and etc [other restrictions], that's not the path. We believe more in carrot than in sticks. So you have to find this carrot that people will follow. But for sure you need to combine both directions. For sure we have to change things.

***Interviewer* #1 (D) 11:21**

For the 15-minute walk to take place, I gather that you got to have a minimum population density in a given area, right? So, what does that look like and then how does that affect different communities' ability to bind together but there will be inevitably places that will become unoccupied, essentially. Another thought is like what other sort of metrics will be useful in gauging what a visionary city system looks like?

***Interviewee* #1 (L) 12:04**

So, that's a good question. **[A person's name], she was thinking about density all the me and what is the proper balance between density and amenities that you need, and the diversity of people in the neighborhood. We believe that in every type of ci es possible like a very low density or a medium density, if you bring enough amenities and interesting stuff, it will work as well as very dense ci es. You always have a sweet spot. If you go too much with density, you will have impossible labor system to deal with. But there is like a very sweet spot that you can find between density and diversity. Very low dense places usually are very difficult in terms of innovation, but you could have very good communities even if they are very low density. Denser communities they usually are more diverse and more innovative.** So, depending on what you are looking for, you have different options. Some people say that in low dense areas, you will only have housing and then people need to use a car and get into the mall. That's not true. In many places in the world, you have places that are very low dense and they are very vibrant. So, it depends on the culture, it depends on a lot of elements. So, we are agnostic about what is the kind of density that we need. It is more about what the culture of the place is looking for. Hong Kong is a great example because the culture of the place allows to protect all these green areas by just increasing the density of the city. In other places, like in Mexico, the communities are living literally inside of the nature. So, what is best? We don't know. It depends on the country of the places so, it's a great ques on that we don't have an answer. It depends on many, many factors like density and innovation. That's actually a very good PhD research.

***Interviewer* #1 (D) 14:31**

Picking on that point a li le bit more like you mentioned like **diversity and innovation as the end effects of having these communities. How do you measure something like that in your research?**

***Interviewee* #1 (L) 14:49**

Yeah, so that's something in my domain. It's very difficult because what we are using for measuring the planet are the same metrics that the British Empire did in the colonial me. So, the metrics are totally bad. If you go to Guadalajara Mexico and you try to measure the wealth of that place and GDP,

obviously it's going to be negative. But the truth is there are families that earn very high income but they are informal and they don't pay taxes. Maybe they are Native American people that were against colonization since the Spanish me 6-700 years ago. So, maybe they were already out of the system, and they don't want to be part of the system. So, **you need to understand the culture of the place, and then you need to build new indicators to measure that because they have innovation over there. They have some source of income, they have a lot of other stuff that we are always ignoring. We are not looking into that culture because we are using this colonial kind of approach so we have to change that. That's what we do in the group. We try to understand what new indicators are needed to understand today's world. The example was a bit extreme but it's also happening here so we just published last year with [a student's name] in Europe a well-being indicator that we can give, and then in the middle of the research, there was this issue with the police, etcetera, and he incorporated that into the indicator. And that was part of the wellbeing indicator. So, we are learning every day.**

And we are also using a methodology that is coming from environmental and climate change. Environment science is very young, so they are building new indicators every day and they have a methodology, so we are following that methodology to build indicators. It's always alive, so we are revisiting all the me. **In the last 10 years, we were using indicator like density, proximity, and diversity. And now we are li le by li le growing that every me. Last year we made an indicator about resiliency. That is an index because you have 125 indicators. In informal settlements, we have indicators about safety or security. So, you have to build your own indicators while at the same me following SDGs. I don't know if you're familiar with the United Nations' Sustainable Development Goals indicators.** So, we always try to have kind of like a standardization, but always with our own kind of perspective.

***Interviewer* #1 (D) 18:04**

So, maybe let's bring that discussions back to the **MIT campus and Kendall Square** . So, **what might be some of the metrics that are very important for this particular community?**

***Interviewee* #1 (L) 18:18**

It depends. So for us, **the important ones are of course all the sustainability indicators like CO2, environmental impact** , etcetera, and **innovation potential such connections between MIT and Harvard and all the industry.** [A student's name], a PhD student, is researching that kind of innovation. Then, like **wellbeing** of course. **Safety and security** are part of that theme. But then we realized that when we were **putting that in front of the developers, they were like, "yeah, but where are the economic elements?" So, we added that into the mix.** And what we learned is that you can have the indicators that are important for you, but since indicators are like a tool to engage with different people you need to have indicators that are meaningful for the others such as developers, the government, and the academia.

***Interviewer* #2 (B) 19:17**

And this was related to what I wanted to ask you guys and it was interesting to hear about the developers maybe having slightly different stakeholder needs of course than everyone else. Interestingly, Media Lab sits in between both being in the community and doing active research and development in collaboration with the community. So, **what might be some key needs from perspectives as the Media Lab and also for the broader community?**

***Interviewee* #1 (L) 20:30**

Okay, yeah. So, **we cannot talk in the name of the entire Media Lab, but we can talk about MIT OS (Office of Sustainability) and the goals they have** . They want to **remove a lot of parking space in order to have more public space, green space, and more ac vi es outdoors** . They are interested in **reduction**

of environmental impacts, so a cleaner mobility. They are also interested in having **people live closer to the campus** . This is utopian now because you have all the biotech industry here and that is making it kind of impossible to have people living and working at a close distance but this is something that we are aligning with MIT always such as like, we should have **more housing for students,** we should have **more housing for professors and staff** . So those are the goals that need to be achieved. But for that, actually, **you need to talk with the City of Cambridge** and say, "listen, we need to do something together," so that's an extra step that we are trying to do and also to the internal part of MIT because Volpe's developers decide to build more offices than housing, even if they have knowledge from us. I mean even it was very clear that the students were also demonstrating saying we need more housing for students. **But at the end of the day, you need to make all the numbers, as you say, from the developer's point of view and everything needs to be on balance** . So, they have housing but probably they don't have enough housing as we were expecting. So, it's a good ques on as for what is meaningful for us. **We want to replicate the 15 minutes, walkable city here,** at least something that [the PI] is working on is equally fantastic to having more affordable housing. And that is the path into mobility so that's the interesting thing like you cannot only look into mobility, you have to look into why mobility is like that and on to other factors.

***Interviewer* #1 (D) 22:38**

How do you expect that the demand for population growth in this vicinity area will change over me? and how will the transportation system here evolve in order to respond to that?

***Interviewee* #1 (L) 22:53**

That's a great ques on. I don't have a crystal ball but talking with some experts about something that is happening and that's a risk. I don't know if it's true, but a lot of the **Biotech industries are star ng to move outside of Cambridge – they are star ng to go to Watertown, because land is less expensive. So, if the government – here I mean Cambridge – is not sensitive about this, they can have a bubble where the land is so expensive that nobody, not even the Biotech companies, are going to want this land** . So, they need to start with some **awareness** about how the market is kind of evolving.

If they don't stop this trend, a lot of the student population will leave. This is going to be bad because, going back into our talk, the **"innovation potential" is going to decrease** , for sure. Because you are **killing the diversity** … you are going to have amazing Biotech people, very smart, very amazing, but you are going to lose maybe the computer scientists [*unintelligible*] … again, a small industry around Biotech, they are moving to Watertown, because it's less expensive so you're already losing part of the ecosystem … just because you are not being sensitive about this issue.

So, I think: **probably transportation is not going to be able to follow the change.** So, let's see, let's see, I don't know, I have a really good ques on how that's bad. [*unintelligible*] … Let's see, because if, again, the housing here is going to the Biotech and **housing is taken by the Biotech people maybe we are going to have one "15-minutes Workable Place", but with lack of diversity** because it's only for this type of population. So where are we? That's why it's important not only to have a people living and working in our conditions but also the diversity of people living and working so can't always say, "No, I want to have also the people that clean the building, they shouldn't be leaving; they're the students that … should leave." So that's the challenge: it is like **"15 minutes walking distance" for everyone, not just for one non-diverse group of people.**

***Interviewer* #1 (D) 25:09**

So, when we were talking about the mobility idea it is really **[about the] 15-minute [walking] distances within a community** . So, **how does that sort of interplay with the transportation in and out of the system and interact with other systems?**

***Interviewee* #1 (L) 25:29**

Well, I mean you always have public transport and related du es, but also the shared mobility and of course you are keeping the … cars and all these other options like for moving between different, let's say, urban areas. **Of course, the car is probably one of the most efficient, but we also have public transportation. So, we are not saying we have to kill the car** , [but] like **the car shouldn't be the center of the city.** So, we can always show this kind of hybrid point in Amsterdam, the Netherlands.

[unintelligible] … I would like to pick a lot of ci es *[that favor?]* **the bike and the pedestrian over the car.** So, it's not that we hate the car, we love cars – but isn't this like issue that doesn't make sense to have … *[unintelligible]* … these two terms of steel and iron that can go 120 kilometers per hour gridlocked every day in the same conges on, polluting. So, the car should be on the highway, instead of in the city. **For the long-term future, we are always thinking: What if we have a "mobility mode" for when it's in the city [and it] goes into this kind of lower speed and merges with the pedestrians, but then you can get higher speed when it goes onto the highway. And this is all more or less electric, so that's a li le bit of our vision** … [*unintelligible*]

I like [cars] in the future, but they also have the "human scale" when they're in the neighborhood. And again, if everybody's living in our 15-minute walking distance and not only Biotech but extra people, then these kinds of connections with neighborhoods are going to happen at very well-defined moments. And it's going to be actually very easy to manage to navigate, because it's not peak hour all the me. Everybody has to go from one point to another and now it's more like, probably, people going to see other people. So, that's more or less the approach.

***Interviewer* #2 (B) 27:44**

Couple more questions? You guys have another minute for a couple more. Okay.

***Interviewer* #1 (D) 27:57**

One of the things I wanted to ask about: okay, so to get there – to get to that sort of vision – **what are some of the baby steps we have to take now in order to get there?** We cannot say, "Oh, we're going to change everything, you know, you live there you go there?"

***Interviewee* #1 (L) 28:14**

No, no. Yeah, I think, first of all we have to make a frame. First of all, **we need to help people to think that the future is beautiful and is [possible]** . I think that's a very small – but huge step. Like, we can live in a different way, a li le bit and, and how that looks, like healthier food. **Local production is very important and like 1/3 of the energy in this planet is being spent just improving food production** of food, so 1/3 … I mean, that's crazy. So, yes, globalization is great, and I am not against that, but I think **we have to look into local production of things that produce a lot of the environmental impact. Bringing things from the other corner of the world usually is not very efficient in terms of sustainability.**

Thinking about more local solutions , I think that it is very important as a first step … and star ng to encourage people. And that's more common here [in Cambridge]. It depends on the country, again, because in the US, maybe the government has less power to help people. I mean the government here is a li le bit different. But in Europe, for instance, it's very easy for the government to start deploying policies where maybe the housing is more protected and unexpensive in the districts and you have like a

coupon for. Here, there are a lot of policies where you build a new house, and 20% of that house needs to be low income … Developers what they are doing is taking that chunk, and putting in a different place. In the US, I mean. Like so, why did they do that? …

[unintelligible side conversa on]

***Interviewee* #1 (L) 30:11**

… It's because here [in the U.S.] it is more like a conversa on between the developer and the government, and they can get into this agreement where they say, "Okay, I removed this housing and I put it in Watertown, and not in Boston, but I built a new park, and then the city of Boston [approves]." In Europe, they're like, "Listen that's a specula on, so we cannot approve that." … this is more like a government-centric problem. Like I'm agnostic [about] what is best or worse, but what I am saying is that probably **we need to find mechanisms where even the developers want to bring this diversity** . So, it's again the carrot.

Usually is about the amount of the users. So, **we have to change this idea** . We **always say that now we are living in this echo chamber.** Okay, so we used to live in a very diverse city. Okay. But li le by li le, we are star ng to live just with people like us. We are listening only to people like us on Facebook and on social media. If I don't like "your show" at the end, we are isolating ourselves. And so, we are living in our own echo chamber and so probably we are living in a neighborhood of people like us. Our neighbors are like us. And that's kind of a trend that, and it didn't used to be like that. But it's happening now very often so can we help people to decide, "No, no, I want to go back a li le bit to that kind of city where I used to go down to the street and to a bakery and they know my kids" -- you know, kind of like from the movies know New York, where you have these small business. So, if we can go back to that kind of mentality, that could be a huge, very interesting game changer. Unfortunately, today people are asking for: "No, I want to have my luxury house with the gym downstairs," and that's kind of what is killing this idea. And then developers are saying, "Listen, this is what people are asking me for." And even sometimes low-income people they say, "No I don't want to live with [them] … I want to live with my people."

So, I think all of us need to change a li le bit our mentality and find how rich in terms of cultural richness is, again to work together and live together, breaking those kind of walls. So, that is a huge step. **But I think the mentality change is the first step, then technology, etcetera … and legislation, that's to follow.**

***Interviewer* #1 (D) 32:58**

Yes, I completely agree with you. **But a change in mentality can take quite a long me …?**

***Interviewee* #1 (L) 33:03**

Exactly. Well, it took only 100 years … actually it took less than that for the car. Yeah, it was a Ford and Rockefeller in 20 years they just changed the city … [unintelligible] … you see how a city like this was human centric. And then, 50 years later … [unintelligible / deleted lines] … the entire city became car centric.

I mean, it's unbelievable how plastic our brain[s] [are] and how can we change our mentality very quickly. And probably you went through that in the last, I mean, the last two years. We went through a pandemic, and we have many very, very different thoughts. We are more flexible in some things – we are more rigid in other things. So, in a couple of years, we can change the mentality of people. If you have the tool or if you have the carrot or if you have the assistance.

I think that's it's true that further changes, probably, is taking more me, but … And in the short term, I mean like people are talking about electrification, people are talking about a reduction of parking, like, having more space for bikes and buses. Like, [in] **Europe these would be called "pedestrianization" of the streets, so you have more public space for bar and restaurants. We have more [space], and that's I think very good, mostly in general. In the US, [there is a] quarter here of public space [and it] is not the same as other places.**

So, recovering the public expense for the people, that's good. So those are very small steps: like **having more bike lanes, more space for public transportation, and a space for the pedestrians to shop in the streets** . That's kind of the very small baby steps that are the traditional ones. Of course, you're going to have **a lot of friction from many places like probably businesses and small businesses. They always are against beautification of the strip. But what they don't realize is that they are the most beneficial and they're always against that and then when it happens, they are super happy.** But I mean that that's not new.

***Interviewee* #2 (M)**

I mean, you know about these smaller steps be er than me so, so I wouldn't get too speculative, but I wonder too, in a city like Cambridge and Boston it's seen as there's these different places in such close proximity, you know, with different policy and different governing structure. And then also with like 50% of the greater Boston area being University and students.

I wonder if it's an opportunity for behavior change, even within the universities, to have community members that adopt behaviors more quickly for like new ability, new mobility, or something, and then sort of transfer that into the greater Boston area and into these other places. Or even if different places, working together in a more effective way would be more beneficial, like **Boston and Cambridge working more closely with one another** , or even like the University of their decision in bodies, you know, they seem like these would have been higher.

So, to come in, there's some really wonderful walkable communities and universities but then, is that something that transcends to the community that's outside, or how could it, how could they be more open, or even if they are open, more welcoming or more adaptable or even like a role model or something to do a bunch of fun stuff here, and then go over the river …

Students are the targets for, like, seeding all this dream that you were talking about . And when they, when students go out of this campus and realize all the pain points and difficulties people are having, or maybe even some convenience and they will build, maybe enjoy having spacious places with a very large spaces for themselves but, I mean, but then having lived this life that is very desirable. [They] come to [be] advocates in the local communities.

***Interviewee* #1 (L) 37:56**

And that's a li le bit what MIT is for you, it is the next step. What we are trying to do is, of course it's difficult now … but **what we are trying to do is become a "use-case" for the rest of the community** .

So that's super important. I think it is really, and t **he most challenging thing is like having unlikely partners working together** . And that's the only way you're having real impact is this: **unlikely partners working together with a common goal** . So, we try always to have this kind of idea of "mutualism". It's not even collaboration, because in collaboration, you need to agree that brutalism is more like, "I am being selfish." You can be selfish, but our selfishness, works very well like … like a flower, the bee doesn't care that much about the flower, he's just trying to eat; and the flower doesn't care that much about the bee. But this kind of a Buddhist machinery *[?]* and that's 90% of nature is based on

mutualism. So, it's not predation, not big fishes [eating] small fish … that's only 10% of nature, or at least 14% in the ecosystem.

***Interviewer* #2 (B) 39:06**

Does this give a win-win for the different stakeholders?

***Interviewee* #1 (L) 39:12**

Yes, but most of the me, as we were pointing out is: you need to have **different ci es working together** . You need to have **different parts of different neighborhoods, different stakeholders** , and how do you, how would you frame that we missed a scenario to them. That's the challenge. That's what we do in the group [MIT Media Lab], a lot of me is like, that's why we build these very sexy tables with lights to explain to them if you want to get a look at that communication.

***Interviewer* #2 (B) 39:42**

Did we miss anything? Is there anything else you think that we should really know or that would be important for us really understanding the direction of transportation and the future vision of it right now?

***Interviewee* #2 (M) 39:56**

I think you guys could go really deep into the group's research if you wanted to. I mean like we mentioned, I think a number of the papers and different projects and so this is like such an entry point. Yes, so the way to do things if there was something that was more interesting, we could always share papers. That's definitely a dig deeper.

***Interviewer* / All**

Thank you both so much for this opportunity to discuss transportation and the future … we really enjoyed the discussion.

Supporting Documents and Resources

Volpe Center Redevelopment: h ps://volpe.mit.edu/

Persuasive Electric Vehicle: h ps://www.media.mit.edu/projects/pev/overview/

United Nations Sustainable Development Goal Indicators: h ps://unstats.un.org/sdgs/indicators/indicators-list/

Research Papers:

Orii, L., Alonso, L. and Larson, K., 2020. Methodology for Establishing Well-Being Urban Indicators at the District Level to be Used on the CityScope Pla orm . Sustainability, 12(22), p.9458.

Alonso, L., Zhang, Y.R., Grignard, A., Noyman, A., Sakai, Y., ElKatsha, M., Doorley, R. and Larson, K., 2018, July. Cityscope: a data-driven interac ve simula on tool for urban design . Use case volpe. In Interna onal conference on complex systems (pp. 253-261). Springer, Cham.

City Science Lab - Image Captured by *Interviewer*s

Persuasive Electric Vehicle (PEV) - Image Captured by *Interviewer*s

Cambridge Traffic, Parking and Transportation department

Introduction to the interview

Thanks for taking the time to answer some of our questions. We are currently graduate students at MIT and this is part of our assignment for System Design and Management class in the MIT SDM program.

Our focus is to understand the future of the MIT campus and Kendall Square transportation plan. This interview will take approximately 30 minutes to an hour.

Warm up elements:

Q. Please tell me a little bit about your background, and how you got to this role?

A. I have always been interested in transportation. My undergraduate degree is in civil engineering. And then I did Masters of Science and transportation at MIT. My first job was working for the city in the community development department – which is the planning department which is in the same building, and we work very closely with them. I worked there for 5 years, then I moved to Philadelphia, New York City and back to Boston in 2010 as a consultant. Later, this position became vacant when the previous director retired.

MIT area is really fascinating place to work, even for a relatively small city, but having the diversity surfaced most complex problems it has and it's also been very innovative and progressive on transportation for many many years so it was really a great place to start my career but also it was great to come back to when I moved back, or when I came back to this job about six and a half years ago.

Q&A:

Q. I would like to know about recent initiatives. When I was researching the TPT, there was a project called Vision Zero. How is that going, what has been successful, what are the challenges?

A. We adopted a Vision Zero commitment in 2016, which a lot of cities around the country and around the world have adopted, as a goal of eliminating fatalities and serious injuries. It's an interesting thing because it's both an aspirational goal, it may be very difficult to get there, just given the sort of behavior of drivers and other things that impact fatalities and serious injuries but at the same time, if we're not willing to make that kind of a commitment, then what are we really saying about our goals. When you think about it from the individual person perspective, the thought of losing a loved one or having someone get seriously injured and not be able to work anymore… These are really significant events in people's lives and so it's easy to let generic overall statistics mask the fact that like each one of these things happening is an individual tragedy in of itself. So if you think about 45 - 50,000 people dying on our nation's roads every year,

each one of those is a family and a community that's impacted. But because they happen in these very small increments typically, unlike a plane crash or a major disaster, we don't spend as much time thinking about them even though they killed so many people. So I think it was really important for us to make that commitment even though, as a relatively small city with narrow roads, relatively low speeds, we don't experience a tremendous number of fatalities. We have years when we have none. We have years and we have one or two, once in a while we might have three or four, but it's not like New York City or Chicago, where you have hundreds of deaths. That's a combination of, small size, but also the built environment makes it pretty hard given the congestion and the roads, it's pretty hard to speed in Cambridge, at least, other than the middle of night. But we still do see these serious injuries and the occasional fatality, particularly among vulnerable users like cyclists, pedestrians, the elderly, the very young.
We've been doing traffic and safety improvements, bicycle safety improvements, and all kinds of different things for many years. So there was an aspect where at first, I think a lot of people felt like well why are we even bothering, we're already sort of committed to this. In terms of thinking about success. Obviously we are driving towards eliminating fatalities, but the serious injuries are a more complicated topic. There's not great metrics for that, because unfortunately when someone dies, they're dead. I know it is sad but it's sort of true. With serious injury, it depends. Someone can be taken away in an ambulance and you think oh my god they have a really serious injury they get to the hospital turns out. There was a lot of blood but they can actually go home the next day and they're sort of more or less fine. And then you're gonna have someone who looks okay. They've even walked away from the scene, and then later in the day have to go to the hospital. Turns out they have a serious concussion that they didn't realize.
So, it's very hard to track just based on the information we have, so you really have to start to connect police report data and crash report data with emergency room public health data and that's a connection that doesn't really exist really anywhere that I'm aware of, at least in the United States. It may be something that's easier to do in some other countries where some of the systems are more integrated and centralized. It was important for us, in the sense of really just clarifying like when you're trying to make a decision about this, about whether to, you know, take out a little bit more parking because it's the right thing to do for a safer street, that we should always land on the side of doing the right thing for safety and be willing to push back on the resident or a business who's saying "how can you take out this parking space?" and say " I understand your concern and we don't want to ignore it but, this is a less safe design. And if someone gets hurt or someone gets killed here…"

We've been very public about that's not an acceptable outcome for us. Unfortunately we do sometimes have to accept it but we treat it as if that's not okay. I think in the way our country works, we've just gotten used to the fact that so many people die and get injured on our streets and roads, and as we said earlier each of these is a very individual tragedy that impacts the whole community, and we just shouldn't brush these off as the cost of doing business, as often happens. You see that in the press coverage and other

types of ways that crashes get dealt with. They just become these statistics, you don't really think about the human impact that it has.

So anyway, has Vision Zero dramatically reduced the number of deaths? Not really, only because we had so few to start with, but it really has refocused our efforts. And, like I said, clarify for decision makers if it's a choice between safety and something else, you really should come down on the side of safety, before you compromise on that. Obviously sometimes the decision making is not quite so easy or so clear, but it does help clarify what you're actually viewing as most important. If you talk to traffic engineers they'll always say, safety is our number one priority, but then when you see what they actually do you're not so sure. So this kind of helps make that case more and more clear.

Q. For example, yeah. So, the maximum speed is 20 mph,

A. Most streets we lower the speed limits to 20 mph. I mean it was definitely part of this Vision Zero. For a long time, because we don't get to define our speed limits independently, the state plays a big role in that, for a long time the default speed limit was 30 miles an hour. Then there was a state law change, I think also in 2016, that allowed us to reduce our standard speed limit of 25, and then gave us this ability to implement safety zones of 20 miles an hour. I think the vision that people had when they passed the law was okay: well there's a senior center here, school zones, you have a park or playground and we're going to reduce the speed limit to 20 in that area. We sort of took the opposite approach and said we're gonna make everything 20 miles an hour unless there's a specific reason, like Mass Aveto makes that 20 miles an hour, I think we just be unrealistic given the traffic volumes.

Also a lot of it comes down to the built environment. When you're driving down Antrim Street which is the next street down. If you drive 25 miles an hour on that street, it feels really fast. If you drive it 25 miles an hour on Broadway or Concord, or some of these larger streets, it feels a little slow. So I think you have to have this sort of level of realism about, you know, without doing really significant traffic calming to physically bring the speed down, there has to be some relationship between sort of the built environment and land use and what the speed limit is. But for most of our streets, they are quite narrow, they are residential, they feel constrained, and so a 20 mile an hour speed limit was really the right thing to do. Obviously policing and enforcement is controversial, for a variety of reasons, so the police don't do a ton of speed enforcement, but I think it's still been successful. We're going to be doing and after study, we only finished the implementation of all the safety zones that were delayed by COVID, so we're sort of midway through. Then we had all kinds of problems with our contractor because of COVID. So we just finished it out. I can't statistically say yet whether it's had a big impact, but I feel like even just the sort of policy level of being able to say yes. Most of our streets are 20 miles an hour I think does set a tone of what the expectation is, but that doesn't mean that there's not people when I drive 20 miles an hour down certain streets there's no one behind the honking saying why the hell are you

driving so slow. But, you know, at least I can feel like, well, this is what I'm supposed to be doing and you're the one who's being ridiculous because you think I need to be driving faster.

Q. Is TPT policy decided independently or do other organizations for example, US DOT, MassDOT, the Federal Transit Administration, affect your decision making for policies like Vision Zero.

A. Most of what we do is locally decided, you know, Massachusetts is a pretty strong kind of home rule state are local municipalities, you know, so things like street design parking regulations, those kinds of things are, you know, completely within our control. The, and there's the desk department actually has, enabling legislation from the state that gives the director certain powers that might not otherwise be given to the municipality not, most of them are just sort of standard things with a few things like being able to establish a resident permit parking program, which does require state approval in order to be able to, to implement.
So they're mostly local but yeah I mean like I said it speed limits. They, you know, truck restrictions are two things that really masked off please much more for the state in general and through MassDOT plays a much, much more significant role, like we can't ban trucks on our streets without approval from MassDOT. So like you see traffic restrictions but they've all been through a study process and then approved by MassDOT or its predecessors.
You know, that's sort of the main role for the state, sort of day to day, I mean, you know, people say oh well you have to have as a state highway and like it doesn't matter, that's just a designation we own the road so we control what what happens there so like we're making a lot of changes for bicycle safety on many of our streets, but particularly Mass Ave. people who are guests will say well doesn't, doesn't matter. To prove this, I'm like, Nope, they don't have anything to say about this to me, obviously we have to follow design standards, some of which are federal zoning which are our state, you know, or at least have or if we don't be able to defend it sort of from an engineering perspective so there's a lot of policies like the Manual on Uniform Traffic Control Devices, or, Massachusetts has design standards for a variety of things so we try to follow those. But like I said, if we don't follow them, or work, it's not there when it's required to follow them. It's just that if we don't, we have to be able to provide, you know, both sort of operationally and legally defensive reasons for why we're not following. And then I think at the federal level, the main one there is really around trucks, because we can't, Because what you're most Trucking is interstate commerce. And so we can't, you know, people will say, why can't you tell these trucks, they can't drive on the street, and even beyond the fact that MassDOT has to approve the truck restrictions. We're also sort of required constitutionally to provide access to these interstate carrier so we can't just be like, you know, you, you can't drive on the street unless you have to, you're going to the street or things like that because we have

to, you know, if you're a interstate carrier you have the right to go, sort of, to on unimpeded access, you know, and that's the physical reason like there's rows like model drive which physically can't accommodate trucks, or some other kind of, you know, something like that but in general because even the truck restriction. If you're going, if you're delivering to that street, you can still go down that street. Obviously if you're delivering to Wild Drive or something I'm going to drive and you're 14 feet high and there's an 11 foot Overpass, then you're not getting through, no matter what you do. That's just the physical reality but beyond that, a lot of the sort of regulations of trucks is essential, like as another example as we've been working to get more safety equipment on trucks. So our trucks have things like side guards which prevent pedestrians and cyclists from getting kind of pulled under the truck and getting run over by the rear wheels which is unfortunately a common way for someone to get killed on the street. We would love to require that for all trucks that operate in Cambridge, but that's the federal power, it, it makes sense right like you can't be like, oh, this one little city has this rock requirement that nobody else has and those trucks can't come in, you have the kind of chaos if things happen that way but it's so frustrating for people because they want us to be able to say no this is unsafe, you have to do it differently so there's, there's definitely places where we're significantly impacted by, you know, the federal and state governments but, but, but the reality is most of the decisions we make are kind of really local, local decisions.

Q. So our decision has also got equal priority to the government.

A. yeah I mean I think the other the other challenge in the near the cost is you've got, all these little cities and towns and and you know, there is even if, you know, even if it's a legally okay for us to have a different rule on something that Boston does, like, you know, sort of, logically, kind of silly right like for if we had a different, you know, design for our, you know, bike lanes than Boston did like it would be very confusing for everyone. So we do try to follow some sort of some amount of regional consistency but like, just as an example, like a loading zone in Boston is 30 minutes, commercial vehicles only.

A loading zone in Cambridge is 30 minutes for commercial vehicles 15 minute limit for private vehicles in a loading zone in Somerville is 20 minutes for commercial vehicles in five minutes for private vehicles, and I'm like that, I like if I was a truck driver, I'd probably be like, I give off I'm just gonna do whatever I'm gonna do, just like why this, I mean, it all, there's reasons for it and it makes sense to us individually but reasonably, it is kind of silly that we have all these rules that are just a little bit different, each of the different mentality so I feel like, it, local decision making is good and I definitely support it but there are times when it winds up kind of creating, maybe not the best outcomes.

Q. So TPT has partnered with other cities on different regulations, how have they partnered with MIT, local businesses or companies or engaged stakeholders in the past. Have there been partnerships focused on things like sustainability or the future vision for different areas?

A. so I think it's varied somewhat over the years but there's certainly been I mean, you know, MIT Harvard large developers, you know, and also small businesses and business associations are all really critical partners for us in what we do because both because what we do impacts them what they do impacts us but also because, you know, like for example with a Small Business Association, they understand what their members need in a way that we can't. So just like with MIT, you know, we work with them a lot on what they have this whole development arm I don't know if you're familiar with, with the tempo but that's basically the manages the endowment, and one of the ways that they they invest is in local real estate so there's a whole real estate development part of the TIMCO. And so we work with them a lot, critically in Kendall Square, you know, like they're developing the Volpi site, they just are midway through this large project, sort of right in the heart of Kendall Square that's building graduate student housing but also a bunch of commercial buildings. So I think we partner with MIT a lot that way, but also, you know, there's a lot of academic development that we have to work with them on, but also opportunities.

You know, and there's more, this is probably where things have been more like not totally like sort of investment wise but just in terms of the level of engagement. Used to be that, you know, an urban design professor at MIT was much more likely to be working with, you know, Singapore, or London or Barcelona, or wherever, somewhere overseas or, you know, our large cities around the country and not have any interest in what was happening in the backyard. I think there's been a lot of growth of partnerships with, you know, on the transmission side, certainly, on with with us and with course one, you know, a little bit with Sloan and some other groups, you know, in terms of, you know, partnering sort of on their research and and sort of applying it or doing research, locally, or like we have this, you know, like we've, we've talked a lot different really great guys across the finish line with like some groups that are working on to the smart city technology. And you know, you know, testing some of that here, because it's like, well, you know, easier to walk down the street and see if it's working and have to, you know, fly halfway around the world to see if it's working that kind of thing, so yeah I think that that's really, there's been Harvard as well as MIT. There's been, you know, sort of this growth and sort of local engagement and really recognizing that, you know, they're part of this global community but also very much part of this local community and and and that pays dividends in the long run in terms of people feeling like yes MIT is engaged in the community they're helping, you know, there's a whole, you know, Job Center and trying to make sure that local residents are able to benefit from all that, you know, developments that are happening, you know, in the area, things like that so I think there's definitely a lot more of that type of engagement and partnership happening, with MIT as as well as with other businesses and other institutions but certainly MIT has been, yes to giving it to you as they used to be when I was a student, like, Kendall Square was kind of the back end of the campus and it was kind of dead, most of the time, everything was focused on 77 Mass Ave I think as time has gone by, They've really, you know, with the opening of some of the new buildings in Kansas where it's really created a second front door to the campus and I think they're much more focused and there's a lot happening in Kendall and that's kind of where the

excitement and the new development and the activity is and so trying to kind of have these two poles to the campus and so I think that they've really sort of reoriented their vision for what, what is their campus, how is their campus relates to the rest of the Cambridge community.

Q. So now, let's talk about the current trends related to sustainability. We have found this graph with current data and predictions for 2020 to 2030 showing the percentage of people walking is increasing. How about the rate of this trend and if you have any data about Vision Zero and how it is affecting this.

A. I know you've asked in advance and we didn't have a chance to find them, but we definitely have more [data and graphs]... I think that the trends we've seen shows we're already in a pretty good place when it comes to sustainable transportation. Walking, has always been one of the dominant modes, just because it's such a compact city, and there's a lot of people who live and work in Cambridge.We've seen a continuous increase in percentage of people biking, partly because of Vision Zero but also related to a city ordinance that was passed -- or amended -- last year that requires us to implement our separated bicycle lane in a very short period of time.It's only within the last 5 to 10 years that we, as a city, have focused on what we can do to help improve transit - trying to work on bus priority, bus lanes, better waiting facilities for bus passengers and really partnering more with T. Twenty years ago we were sort of like, well the T does their thing and we do our thing and I think now we're much more viewed as we can help T and the T can help us. Obviously it's not really clear what the long term impact of COVID is on driving alone and people wanting to get on transit. Prior to COVID, we were seeing these kinds of trends continue and it has certainly had a positive impact on biking. Walking probably hasn't changed much because it's maxed out in terms of people's reasonable walking distances. Pre-COVID the T was bursting out of steam: if you tried to get on a train between Central and in Kendal, there were times when you could stand there for three or four trains before you could squeeze on.It's not like that right now and we are seeing a ton of trending news.

Q. So, I love to talk about the future, mainly sustainable transportation: How can we get to no emissions. As you said, walking is that dominant method for transportation and are there any visions for getting to no emissions?

A. We've been more on the planning side at this point and now we're starting to figure out how to actually implement it. There's a net zero action plan for Kendall Square

specifically, and given the scale of development, is challenging. So on the transportation side, there's electrification of the vehicles and buses which is challenging in a place like Cambridge, [for example] many people don't have driveways, so the old EV charging is much more complicated. We're trying to figure out solutions for on street EV charging. Just as one example, the electrical utility [name*] wants to have a giant electrical box for each set of charging stations, and so you wind up not just with the actual physical charging station which takes up some room and sidewalk , but [with] an ugly three by six foot tall metal box that needs room on the sidewalk and doesn't really add to the urban design or the neighboring feel. When it comes down to actual implementation, it's more complicated and less visually appealing than you might think. The other issue is that electrification depends on clean sources of energy which Massachusetts is trying but struggling a little bit to get there. There's a lot of other environmental impacts of having people, even if driving with a clean vehicle, it's still a paved area, parking (that could be repurposed for other uses) , it's still a safety issue. Also, leaving aside the long term questions about the sustainability of battery technology - and that's not my area of expertise - so I'm just going to assume that hopefully someone will solve for that. But even if you electrify the fleet, yes we eliminate a lot of carbon emissions, but there's still a lot of negative impacts of having all these cars. So I think we definitely view it as pushing more on sustainable transportation modes. It's a massive oversimplification of the scale of the problem we have with private vehicles regardless of what their propulsion technology is. We definitely need the netzero approach and carbon free transportation but also need moving towards these more sustainable modes.

Q. Are there any meetings with citizen groups or other partners/stakeholders about your proposals?

A. Probably the biggest initiative on that was done by community development - called the New Mobility Blueprint - The concept for doing the study started maybe three or four years ago, took a long time with COVID. Back then, there was a period of time when we thought autonomous vehicles were going to be here tomorrow. It turned out to be a much more complicated problem than people thought. Between that and Uber and Lyft and scooters sort of came in along the way, there's all these new technologies and we need to wrap our heads around how to deal with this from a regulatory perspective or policy perspective but also from our implementation perspective. And then there still is a desire to have an on street electric vehicle charging pilot. A lot of these kinds of studies it starts off with some pretty grandiose ambitions and then when we actually start to engage in the discussions with the community and have some public meetings and later an advisory group, ending more complicated and less exciting when you dig down into them.I can't remember if we actually did any big public meetings, but there was an advisory group that was appointed and provided guidance to the study along the way. It created an opportunity for some of that region and I think as we move forward

with the charging on street, electric vehicle charging pilot, bringing more opportunities for engaging with the community.There's absolutely people who are really interested and want to have a lot of input, but for a lot of people it's so theoretical. Even if they read the document or come to the meeting or call you, they're not necessarily going to react until it's “what do you actually get to do on my street” or “what do you actually get to do in my neighborhood”. Unfortunately, I had a meeting a few weeks ago about a couple of initiatives to do a few different things a new blue bike sharing station but also some electric vehicle charging, and there was definitely a group that was pushing back on the idea that you were going to put vehicle charging and reserve these spaces for other people's electric vehicles and where do I park my car, or it's all rich people with Tesla's and why should they get reserved parking. So the community feedback is,as you're actually talking about changes on people's local streets, a general progressive approach that can sometimes go out the window. One of things I always think to myself is if you showed up today and said we've got this great idea to drive 10 of these cars that are powered by gasoline. We're going to build these like places with all these curb cuts and underground storage tanks for a toxic liquid and we're gonna call it a gas station. People would freak out, they would say no no you can't have that in my neighborhood, but because the gas station down the street has been there for however many years, and
you're used to going there you're okay with it but if you tried to introduce gas stations to people's local neighborhoods now, there would be a lot of pushback. It's just that we're used to certain things and not used to other things.

Q. The Kendall Square and MIT area is well known for its innovative nature. How is the TPT involved with new transportation technologies, when people try to apply there. For example, autonomous vehicles or any other type of the transportation system.

A. There was this period of time a few years ago where there's a lot of activity. Toyota has established one of their AV research centers in Kendall Square.I think they're not there anymore.They became very focused on what became the 2021 Olympics and sort of demonstrating AV technology in Japan for that which made sense. We've talked a lot with companies that might want to do AV testing in the area, there's a couple that are testing in Boston and they're talking maybe about expanding to cover parts of Cambridge, as well. We've definitely engaged with MIT researchers , including some who are looking to kind of commercialize the technology and so it's not just a theoretical research initiative but they're OK with working on this device or this thing and I want to test it and maybe we can work with you. Well one of the challenges for us is that our city council has a lot of concerns around privacy and surveillance, and we actually have an ordinance that requires approval for any type of technology that could potentially be used for surveillance. So, when we've had conversations about testing

certain particularly sensitive devices they've not gone very far because the council has not been interested,as we don't know what's going to happen with the data,where it's stored and all the privacy issues. It's been more challenging I think coming from our side,as we can't do this, and not that the people either, or researchers and Kendall Square or MIT or Harvard have not been interested. We had a long engagement with Draper labs, about doing some signal technology, testing and research and in the end it actually fell apart because they couldn't find funding, but there was also a lot of challenges around, , working in Draper,as nobody quite knows what they do and there's a lot of people think that they're basically a front for the CIA or something so anytime you mentioned Draper, people, radar goes off and they're a little bit like what's going on, what do you what are they actually doing. It's also we're a small city and we have limited staff and for the size of the city we actually have a lot of staff, but it still means that if I want to have one of my engineers work on some, partnership with some research initiative, like they have a lot of other things that they have to get done for their work and it's, it's harder to find that.Whether you're New York City with 1000s of people or us with, a little under 100, you may still need the same amount of time to engage with that one person who's doing this research, and so it's easier for New York City or Chicago to find the extra staff capacity to spend that half of their time working with someone.I'm always hopeful that we can kind of develop more partnerships on sort of new technology. We are testing things like transit signal priority and we've done a lot around traffic counting with sort of more
with the machine vision technology that we have been able to get our City Council to approve of using cameras for that kind of stuff, not for watching the intersections which is for new accounts, things like that. So we are trying to kind of slowly but surely upgrade the technology we use out on the street.

Q. How many people within the TPT are available for implementing new technologies?

A. It's sort of hard to sort of put a number on it. It's a lot of people like this person spending 20% of their time and this person is spending a couple hours a week or this person's working on something as a new initiative but , in three months. When that's done, they'll go back to something else. We probably have one and hopefully soon two dedicated positions that are really focused on technology. Now, that could be everything from something brand new and exciting to making sure that the cell phones that our parking enforcement officers use are working properly, which is important but, necessarily, particularly innovative. So maybe one position somewhere between a half a position, or one position. Again, not just focused on that but if you sort of add up all the things going on. That'd be my guess.

Q. Is there any idea like replacing the subway system to a new transport system like an automated people mover? This may be dependent on the MBTA.

A. That's the MBTA so you would be hearing about it as a partner. It's a little disappointing even with the new subway cars they're buying they're nice, but they're nothing particularly compared to what some other cities are doing with continuous vehicles that even wash from one end to the other or a lot more technology and board. They're just kind of like replacing what they've got with a better version. But not really thinking about having this be a completely different system altogether. How can we really serve our customers in different ways? There's a natural conservatism built into how the MBTA operates. Maybe someday but nothing right now.

Q. There isn't anything more that's been done on the autonomous vehicle side other than the couple of initiatives you mentioned.

A. There's a couple of companies in Boston, Optimus Ride and then Motional. They are both actively testing in Boston and Motional has been starting to explore the possibility of doing some testing in other parts of Boston as in seaport as well and into Cambridge as well. If you'd asked me three or four years ago how quickly true autonomous vehicles would be here, it seemed like they'd be here by now. From what I can gather it just turns
out to be and some of the, engineers working on this, maybe even four years ago we're saying this but there was a lot of excitement in the other parts of the industry, it's just level three autonomy driving on a highway, where we're in a very controlled environment with good lane markings and sort of predictable geometry is not an easy problem (but in the scheme of things it's a relatively easy problem). Driving on a city street with all the net normal chaos and being able to navigate that is a really hard problem . If you talk to some of the AV researchers, who knows in 50 years but in the sort of timeframe they're thinking about (particularly for sort of commercialization), there are some of them like I don't actually know if this is a solvable problem in any sort of current timeframe. So I
think he could wind up with vehicles that are really just designed not to to try to avoid crashes and obey the speed limit do not stop illegally in dangerous places, and all the other crazy things that human drivers do but then you've got a you've got companies like Tesla that are just like throwing technology out and like sort of seeing what happens and I think they're proving that's not a great approach from a safety perspective, that could lead to more chaos on the streets, particularly if you're, if users. If the end user instead of being given decision making powers that they're not really fully understanding.I wonder a little bit about how accepting the public is going to be as a vehicle that can never exceed the speed limit and can never park illegally and can never cut into the middle of a line of traffic like a Boston driver might do. They're gonna find those vehicles to be sort of very frustrating because what they experience is a lot slower and less control. Maybe you'll be fine because you're reading your book or doing whatever you're doing and so you just don't care because it's just more time for other

things. But I do wonder a little bit if there's like this huge, there's a mismatch between the user expectation and what the vehicle is actually going to do in practice and I don't know legally liability wise how you would like saying, “well, it's okay to exceed the speed limit by five miles per hour but not 10”. If you fully take the driver out of the equation and remove their decision making, at that point it becomes really challenging to do anything other than just blindly obey the law which really none of us do in practice.When you're driving you're always making sort of little decisions about yeah I'm going three miles over the speed limit, but I think it's fine in the situation or I didn't come to a complete stop at this stop sign because I can tell there's no one else around, this is my man. So those little things we all do, if a car can't be is not allowed to do those things, then I don't know if people are actually gonna want to be in that car for any significant reason. So, yeah AV has gone back to being more of a in the future we'll worry about that when it seems to be more real. Particularly for local government I think for state deities that operate limited access highway system, it's much more immediate, you've got cars, you got GM supercruise and some other technologies out there that really can't drive themselves under certain circumstances and they have to be ready to deal with people buying this car off a lot today.

Q. So, assuming the future was now and AVs were actually around the corner, what would the TPT’s interest be? Is it policy? Is it road design considerations? Or is the stance “We just don’t have jurisdiction over what people choose to drive?”

A. There's definitely an element where we always have to recognize that it is appropriate that the federal government sets standards for vehicles. At this point, it is actually problematic that Europe and the US, and well Canada have had to conform their safety regulations. There was a time when cars sold in Canada had to have daytime running lights, and I still don't think it's required in the US, but it's more common. That was a relatively simple thing to have the lights on all the time, as soon as you turn on the ignition.

Even beyond that, things like street design, there needs to be standards and there's vehicle and driver registration licensing should definitely be a state issue. It wouldn't make sense for us to have our own driver's licenses. You could argue that maybe it would make more sense if Vehicle Licensing was done at a national level. I don't see that ever happening in us because of politics on it, but like what are rationally that probably would make more sense because it's not great that we have all these licensed places in New Hampshire driving around in Massachusetts and when we write them a parking ticket, it's much more difficult to enforce it against the someone who's not a Massachusetts resident.We have to recognize that safety structure and regulatory structure is developed for reason and it doesn't actually make sense for local government to start taking over any of these roles because it just will create more chaos and more confusion. That said, I think, the things that would be on my mind are these vehicles safe, that's sort of the baseline as they both have the technology and AI, plus

great sort of training and whatever to be able to operate safely in a complex urban environment. Also, what are the safeguards against illegal behavior and what's the level of control that the driver has over that vehicle and also how does it transition from driver control if it even does from driver control to automated control because like people talk about oh you're in a car on the highway and then it's just when it gets off the highway, then the driver takes over and that is how some of these vehicles work but that sort of depends on the driver like waking up, if they've been asleep. Right now, those kinds of things are illegal, they happen but they're clearly illegal. But in the future, you can say on your interstate trip it's okay to let go of the wheel and not pay attention, then what happens if you're not actually paying attention at the point when the car gets to the off ramp. So we need to know that they're safe and that they can transition between different operating modes and environments, safely. And then, there's a sort of physical reality on the ground: my expectation is that these cars will navigate our streets, as they exist. Again, I'm not interested, I don't have the budget and I don't have time to start putting in fancy new technologies to allow the vehicles to interact with my traffic signals. I don't want to have some fancy and also security-related device that's going to tell the car what's happening unless the manufacturers want to give me those. I don't think that's gonna happen either.

So, I think there needs to be an understanding that AVs have to exist in the world, not that the world has to be changed to accommodate AVs and even just basic stuff we tried to do a pretty good job with maintaining our lane markings, but I can't have an expectation that they're going to be going to be perfect. One of the big challenges is when we pave the street, which our public work department does, we generally wait a couple of weeks before we put down the actual pavement markings - because there's oil in the asphalt and that oil has to come out before you put the paint marks down or else the paving markings don't adhere properly and they come off very quickly. So when you pave a street, there's a two week or so period when there's no markings. So how does an AV deal with that, as there's no centerline, there's no lane lines. It has to be able to figure out just like a human, obviously can do, how to accommodate that or it has to say I am stuck and you need to take over. I have an Acura that has sort of the, all the bells and whistles on,you're driving through a work zone and all of a sudden it just all that stuff says the warning things come on because they can't figure out what's going on around it. But, that's fine because I'm not expecting to take my hands off the wheel or not pay attention but it's just sort of helping me avoid any crashes, but if people are really thinking, oh this is taking over for me all of a sudden...what happens in those kinds of transitional situations? Yeah.

Reference Information for the Interview:

Vision Zero - City of Cambridge, MA (cambridgema.gov)

Transportation Trends - Traffic, Parking & Transportation Department - City of Cambridge, Massachusetts

* Electrical Company name redacted.

Graduate Student Council

SDM Team: First and foremost, let me introduce myself. And make sure that I get consent verbally as well. So I am a student in SDM. I'm doing the master's program so I'm here for a year. So before we get started. Do I have your consent to record?
GSC Representative: Yes

SDM Team: Okay, excellent. And thank you for agreeing to be interviewed. We're going to ask you some questions about your background and how this fits into the overall problem. This is for an assignment, your name is not going to be used, I'm going to scrub that from the transcripts and it's just going to have your title and where you fit in in the MIT universe, and we will go from there. Location for the record we are sitting at the amphitheater at the Stata center, it is October 15 at 1:19pm. Our objective here is to understand how the future of transportation looks at the MIT campus. And the Kendall Square area as well. As already mentioned, I'm a current grad student here, we're doing this for an assignment. What you tell me is confidential, we're going to review it with instructors for grading purposes, but it won't be published or cited on the web. We're going to scrub your name. And so as mentioned, I'm going to be recording. And if for some reason you get uncomfortable, please let me know and we can cut the recording at any time.
So please tell me a little bit about your background. What program are you in? What do you do here at MIT?
GSC Representative: Sure. So I'm a fourth-year Ph.D. student in CSAIL, which is in electrical engineering and computer science. I do work on computer security. Yeah, so I've been here for four years. Before that, I did my undergrad in New York City. And then I stayed there for about five years working as a software engineer. And so currently, I serve the Graduate Student Council as the chair and sole member of the transportation subcommittee of the Housing and Community Affairs Committee.
SDM Team: Excellent. So you don't have any other committee members? You are the transportation person.
GSC Representative: *Nods*

SDM Team: Okay. Okay, cool. So does your program require a thesis?
GSC Representative: Yes.

SDM Team: What is your thesis around?
GSC Representative: So we're working on it? *laughs* Okay. Yeah. Computer Security broadly, specifically, one of the problems I've been thinking about a lot lately is, well, the buzzword is software supply chain, okay. So if you are at a company that's making some kind of online product, you're not sort of inventing the world from scratch, you're using programming languages, libraries, software from other people. And we want to make sure that when you do that, when you bring that in from outside, that you're getting it from a trusted place, and that you're trusting the people who developed it. So there have been a bunch of recent high profile, Solar Winds is the big one from the last couple of months, but recent high profile hackings, where basically, it's much easier to go after some tiny company upstream of a big company. And then if that big company, you know, downloads that software blindly, you know, trustingly,

then you can kind of have compromised either the bigger company or the US government who uses a lot of software from extra people.
SDM Team: Alright, cool. That's excellent background, it sounds like you deal a lot in kind of the realm of ethics with that also, which I think we'll talk about here. So can you describe your normal commute to campus?
GSC Representative: Yeah, sure. So I live in lower Roxbury. Probably 19 out of 20 workdays, I ride my bike that goes through the winter. That's just down Mass Ave. So you see, 15-20 minutes. Okay. And then, on the days when I'm not biking, I take the number one bus, which is pretty much door to door for me. Okay.
SDM Team: How long does the bus take if you choose that option?
GSC Representative: Very much depends on the time of day. So if I'm on it before, like 6:30 am, it takes 20 minutes tops, and if I get on it, you know, 3 pm to 5 pm. It's ready to go to an hour.
SDM Team: Okay, but the bike is pretty consistent in all seasons?
GSC Representative: *Nods*

SDM Team: Okay. Do you own the bike?
GSC Representative: I do.

SDM Team: Awesome. Do you ever utilize any of the bike rental services around?
GSC Representative: Yes, I do occasionally use blue bikes, bike-sharing. Okay. Yeah, but for the most part, given that my bike is my sort of primary mode of transportation. I bring it with me to work. And then if I'm going somewhere after work, I bring it back.
SDM Team: So you mentioned your kind of commute times, yeah. What does your typical day look like on and off campus as far as schedule?
GSC Representative: What I do typically…So my partner is a teacher, she needs to be at work at 6:30 or so. So the alarm goes off at five. I'm out the door by six, here at Stata about 20 minutes later. Usually, go to the gym. And then I'm kind of on for the workday at 730 or so. And then I stick around instead of leaving very frequently. Usually, go home three or four-ish. Sometimes stay later as needed. Yeah, straight home.
SDM Team: Do you typically run any errands or anything straight from campus?
GSC Representative: Yeah, that's a great question. So often yes, I will stop for groceries on the way home. There's a Whole Foods on right off the Mass Ave. There's a tropical foods grocery store pretty close to where I live. Yeah, I also get a CSA, which I pick up at Clover and Boylston Street. So it's a little out of the way, you know, 5-10 minutes out of the way. Yeah, and then just miscellaneous errands. Yeah. Coming Home is usually a pretty good time for that because it's great during business hours.
SDM Team: Do you typically structure your commute home around those errands?
GSC Representative: In what sense?

SDM Team: Do you take a different mode of transportation? If you're picking something up?
GSC Representative: Almost always No. Depends, though, on what that something is. So like, I did pick up a jacket recently for a wedding, and that's something I don't want to shove into my bike. I have to have the saddlebags okay. Yeah, but most everything else.
SDM Team: Okay. I was thinking about the CSA, and I know that can be a lot of produce sometimes.

GSC Representative: Yeah, it's, it's full. But, but it fits okay,
SDM Team: Awesome. That's awesome. So other than a bike, walking, and bus, is there anything that you would consider kind of a typical transportation option for you?
GSC Representative: Those are the big ones. I will take the subway probably every two weeks once. And then I'll drive every couple of months. That's usually a borrowed car or a rental car. Okay. Like a formal rental car, not like carshare
SDM Team: What would lead to you renting a car?
GSC Representative: Usually needing to get out of Boston
SDM Team: Okay. So on a scale of 1 to 10, how happy are you with your current commute on and off-campus?
GSC Representative: I guess depends on what's in scope? I think there's not a ton that MIT for instance, could do. I think there is a lot that Boston in the state of Massachusetts could do.
SDM Team: Okay. Like what for example?
GSC Representative: Oh, so bus priority on Mass Ave seems like a no-brainer to me. You know, if I'm on the bus, there's you know, 40 odd other people, and we're stuck behind people, you know, double parking or driving like Boston drivers down Massachusetts Avenue. And that's, you know, the reason it goes from a 15-20 minute drive in the mornings to, you know, could be up to an hour in the afternoons. **SDM Team:** So am I hearing you right, in that you think a bus-only lane would potentially help?
GSC Representative: Yeah. So yeah, so bus-only lane. Signal priority, if you're familiar, so the light turns green when the bus comes. And these are pretty common in other cities, to varying extents.
SDM Team: Okay. So other than just the bus priority, if you were rating your bike commute on a scale of one to 10, would you give that a separate rating?
GSC Representative: Seven, eight, again, depends on if like, Boston drivers are part of what I'm rating because they're notoriously aggressive. But like so before this, I lived in New York City, and drivers are aggressive, but they're much better at driving. Boston drivers are aggressive, but they don't make up for that with technical skill. You will like you see these like wild U-turns without looking and like, you know, squealing brakes or whatever. And I see people merge into each other all the time.
SDM Team: I see that off often as well. Okay, let me pick on that thread just a little bit further. So as far as the actual traffic in MIT campus, specifically and around the Kendall Square area, how would you rate both bus and bike options currently within that realm
GSC Representative: Both quite solid? Yeah, Cambridge in general does a better, much better job of bike infrastructure. And MIT is pretty supportive. We have you know, I have space in my office, fortunately, but there are a million spots to park your bike. Tools for quick fixes and stuff. Kendall, Yeah. I mean, it's such a short part. It's the last five minutes of my commute, but very little to complain about. Let me think crossing Memorial Drive is not bad, but like if I want to if I'm going along Memorial Drive, that's usually not super pleasant. There is a path right next to cars, and it's not very wide. That's all Parkland. And somehow the Department of Conservation and recreation has decided that its primary job is to do transportation planning for some reason, which is a really unnatural fit. And I think we've done a lot of like, weird inconsistencies between the roads within Cambridge, and then the roads, you know, that happens to be controlled by the DCR.

Buses within Kendall Square. Honestly, pretty good. Yeah. And we have subway access to so if I'm ever taking the subway, red lines, pretty convenient. There's a number of lines that come right through, but one gets me home. Pretty good transit access. Obviously, it'd be great if everything came more frequently, but that's always going to be true.

SDM Team: Have you ever taken anything other than a car to travel outside the greater Boston area?

GSC Representative: Oh, yeah. So flying. I flew a couple of weekends ago for a friend's wedding in South Carolina.

Train, I'll take the train to New York. I've taken the train actually to Cape Cod during the summer. Which works pretty well, although you can't be that picky about when they do, you know, one a day or whatever. Amtrak, down Amtrak up to Portland, I've done. In fact, on in New York. My family's in the DC suburbs. So usually, it's worth it to fly. Eight hours on Amtrak, which is not super pleasant.

SDM Team: Okay, so you're the only person on the transportation subcommittee at GSC. So what drove you to take on that role?

GSC Representative: Yeah, so I'm interested, I guess, in transportation, urban planning broadly, that's obviously not what I study and has nothing to do with my actual research. But sort of someone who enjoys cities a lot. And one of the things that I think makes cities great is walkability and being able to get around, especially without a car. Yeah, just, I find driving is inherently stressful. I'm constantly worrying that I'm going to kill someone. I think I drive pretty carefully because of this. But even careful driving, you know, things happen. Yeah, I mean, yeah, so as I feel pretty strongly about like pedestrian safety, pedestrian and transit infrastructure, and so on, generally.

SDM Team: So here's a good one related to that. If you could add a new way to get around on and off of campus. What would it look like?

GSC Representative: Yeah, that's a great question. I feel that I mean, to pick on something that kind of exists, kind of the scooters. There are private owners of electric scooters. They never made it to Cambridge, a pilot. There was one city councilor who is very, very invested in this and I think had a really hard time getting any traction in the last three elections. After pushing for this on that Cambridge accounting a couple of months, I don't know how it related to Cambridge City Council is full of people who are homeowners since the 80s, and paid you know, $40,000 for their two and a half million dollar apartment, drive everywhere, and really like to vote for bike infrastructure, but have no idea of like, what it is like to ride a bike. And so there's a little bit of a disconnect. And I think that's one of the reasons why like the scooter pilot was kind of doomed is, is if you're used to viewing Cambridge streets as yours to drive around, then anything that's kind of unpredictable is really scary. I think they're not like a perfect thing. But I think honestly, around campus, like, you know, because MIT campus is 20 to 30 minutes end to end, I think sort of a lot more like pick up and go type of options there. It's like I'm not really going to take my bike down the elevator just so I can you know, go somewhere 10-minute walk away and shave off five minutes. But, for instance, I used to work at Google, in New York City, but I visited the Mountain View campus. And they're famous for having these silly yellow bikes everywhere, which are just available to take. And so something like that, probably you would need some kind of warning, or whatever. Because otherwise, then we get stolen Cambridge, Massachusetts, a very different place from Mountain View, California. But I think I think, around

campus, what's really missing is super convenient, like hop on this, with very, very little startup costs to just get 10 minutes away
down the campus. Yeah, and again, I don't have strong feelings about what specifically but the scooters, or really dockless bike-sharing, that I think is a really natural fit for a college campus.
SDM Team: So I think that's awesome. Thank you so much for being thorough on that. Do you feel that there is a market for that among the larger student population?
GSC Representative: I guess it's hard to say I think the economics are still in very early stages in terms of figuring this stuff out. So is there a market and then if it were very, very cheap, I think people would use it. A lot of the pricing models I've seen involve prices per minute, which I think people are not super attracted to. I think like MIT subsidizing some kind of monthly subscription, maybe you have some cap or whatever, so you're not abusing it. But if we did, would maybe make a little bit more sense. But certainly, I think I find myself all the time in this situation in the situation where I have to get from here to somewhere, you know, busy center, or whatever. And again, it's a 10-minute walk, it's on a real pain, but I have between meetings or whatever. I don't want to have to run to make my next meeting.
SDM Team: What would you say are some potential detractors to, or barriers to entry, if you will, to deploying something like an E-scooter?
GSC Representative: Right, pricing is one regulatory stuff is obviously another.
SDM Team: Are you familiar with some of the issues that other cities have had in deploying these scooters?
GSC Representative: Yeah, yes, I tend to think that they are wildly overblown, for instance, I think, take away a parking spot for a block and you have unlimited students, I think, also is unrelated, but I think to take away another spot for you with a 15-minute loading-unloading, and you get rid of like, half double parking. So I think it's municipalities, kind of not trying very hard to solve problems or a lot of the sorts of points. Yeah, I think people really underestimate. I guess they think about it as laziness, but the importance of convenience when it comes to getting around, again, if you're used to parking your car, wherever you can find a spot which might be a 15-minute walk away from where you're going, Okay, it feels like why can't this person go a block away to park their bike? That's ridiculous. But yeah, I don't know. I think when you're on the scooter, it just feels like it adds immensely to the friction, and sort of having low friction is super important for adoption.
SDM Team: What would you say to folks who are concerned with the aesthetics of campus related to that potential alternative?
GSC Representative: I know we have crappy bikes parked all over campus already. I think if you're deliberate about managing where these sorts of things wind up, it's not gonna look all that different. So I don't know that there will be much of a change from an aesthetic perspective.
SDM Team: Awesome. When choosing your personal transportation method or trying to recommend one to other students, how important are things like impact to the environment, in that means of transportation.
GSC Representative: Me personally, less so. I think most of the transportation I take is among the more environmentally friendly but that's not necessarily a leading driver. However, I do know that among my peers, it's a big concern broadly. And so I will when having these conversations tend to play that up.

SDM Team: Have you ever utilized some of those hop-on hop-off scooters? I know you said you've used the bikes in Mountain View.
GSC Representative: Yeah. Once in Santa Monica. And once I think when there was the pilot in Brookline a couple of years ago, awesome. Yeah, they weren't ever a big part of my transportation diet as it were just because what I have works really, really well for me. But I totally see the idea if you're not already carrying a bike or walking.
SDM Team: So I feel like we've probed into that one a good bit. Let me just probe a different direction to make sure I get kind of a holistic view. For folks that live primarily on campus and don't have access to a vehicle or access to a bike that's their own. What are your thoughts on other transportation methods? Let's say an undergraduate student who doesn't have a lot of money trying to go to the grocery store?
GSC Representative: Are you asking what I recommend with the environment as it exists? Or what I would want there to be?
SDM Team: Both

GSC Representative: Okay, well, we can start with what exists. So you can always walk. Every point in Boston is 45-minute walk from every other point in Boston, usually, you can save very much time off of that bicycle, public transit instead. Which, you know, it's not ideal, but walking is always sufficient. And I've actually done the math, you can reach within an hour, really shocking amount of, you know, Boston, Cambridge, Somerville area. Now carting the whole grocery load of groceries an hour isn't necessarily the most pleasant. You can mitigate that a little with one of those granny carts. I don't know if there's a more PC name for that. But MIT also operates grocery shuttles, especially on the weekend, which go to Costco, Trader Joe's. Like I've never used them so I'm not remembering all the details about I think one goes to Market Basket but basically operates you know, hourly during grocery times. We view right about the amount of time you would need to go get your time and think to correctly right back to campus.
SDM Team: Are those options free to students?
GSC Representative: They're free to use. Yeah, but like Market Basket: that's an easy walk away especially if you're starting at dorms. Some of the dorms are a little closer to the Whole Foods. Zipcar is one I see people use, especially if they're going to Costco or trying to stock up for a longer period of time. I believe MIT offers a Zipcar membership for free. So you're only responsible for the hourly usage, which depends on how broke you are as a college student, but you know, might be worth it to save.
SDM Team: So given those offerings, which sounds like there are quite a few. What do you feel is missing, if anything for like, leaving campus specifically?
GSC Representative: I think the MIT shuttle offerings are relatively prescriptive when it comes to where you can get around. I don't know that that's the MIT transportation department's job to solve. But, you know, they have their sort of, you know, blessed list of grocery stores in West neighborhoods, that they're going to get them to keep students free. Once you're willing to use municipal infrastructure, your options widen up quite a bit. However, MIT doesn't necessarily provide lots of support for students to be taking a subway or bus. Faculty, for instance, and staff. If they're not using the parking benefit, we'll get a free monthly Charlie card. Our graduate students I think are eligible for up to like $40 off or something which you know is nice but but it

certainly doesn't set up the incentive structure we want our students to leave campus. Say you gave every student X dollars per month in Charlie Card credit to encourage them to leave campus. The MTA certainly has precedent with other universities, where MIT would only be paying for what students are actually using. I think it would go a long way towards actually having to leave campus and not using the, you know, five bucks round trip or whatever they're spending it as an excuse not to see Boston.

SDM Team: Okay, so probing that a little bit further, just in your role in the GSC. Have you all put any energy around advertising some of these options to folks on the community campus?

GSC Representative: Yes, not necessarily as much as we could. There is a sort of all-in-one guide to the transportation options available, it's linked from the main page of the GSC website, and it gets included somewhere in orientation materials that get sent out every year. How many new students actually see this? I have no idea. But there is a one-stop document outlining everything from walking to bus and subway to commuter rail, regional rail, like plane transportation, how to get to and from Logan shuttles, all kinda in one spot, with a lot of use cases outline. So I suppose certainly there are other ways we can be advertisers, but we're trying.

SDM Team: So just to push a little further on an aspect there. In your time in GSC, if you could do one thing, what are you passionate about doing in this role?

GSC Representative: Yeah, it's all started with I guess the non-answer, which is, I am really primarily interested in making sure graduate students have some kind of a voice and discussion about transportation on campus. So related to my job on the GSC, I sit on the Institute, transportation and parking Committee, which is a formal body that meets every semester, so a couple of times, to do that formal votes on things, like the fee structures, and so on. And that's primarily dominated by discussions about the need for, you know, faculty, staff, contractors, and so on. So my primary goal is to just make sure that you don't have any voice at all in these kinds of discussions. As if I could wave a magic wand and get you the sort of policy change done, you know, independent, how much it would cost MIT, I think, is probably something like, actually free benefits for MIT undergraduates and graduate students. for transportation, so again, some of the small Charlie card money each month, there are existing subsidies for blue bikes, making that fully free, for instance. And so just to I guess, MIT likes to talk about how they want students to get off campus. And there's a lot of friction there. And I think reducing that as much as possible would be good.

SDM Team: Okay. Awesome. And I know you've alluded to some of the pushback from the local Cambridge City Council. So can you talk a bit about that?

GSC Representative: Yeah, sure. So local politics is very, very important when it comes to any kind of like transportation infrastructure in this country. We went through a period that was quite terrible in the 60s, a couple decades surrounding where governments kind of just took land, they did whatever they wanted with it. Often this was really bad. Both from the perspective of it's all sorts of equity and in general, like due process issues, when you're invoking eminent domain all the time. But also, the planning passions of the day are definitely seen as outmoded. Now. In response to that, there has been a huge pendulum swing all the way to the other side, where there's tons of local control for any infrastructure changes that get made and lots of community engagement that tends to happen. So it's really you can do more, you know, small vocal minority of people, who are the people who have time to show up to

community for meetings and certainly who love to go advocate against, you know, housing developments or putting in bike lanes. For instance, on the street I live off. There was a big, you know, community campaign around saving the trees on Nomad Cass Boulevard. The trees in question were slated to be replaced because they're dead. And as part of a larger sort of complete streets redesigned that would put bus priority and bike lane on the cynic in me thinks that the opposition is basically people who like driving through that street really fast. But certainly, I'm sure there are people who earnestly are worried about the trees. And I don't think necessarily the city of Boston has done the best possible job communicating what the plan actually is there. So yeah, broadly, there's almost every project, there's an opportunity for lots of different people to scuttle it. Cambridge City Council in general tends to be quite supportive, but not involved in that makes sense. So they're willing to vote for things that sound good when it comes to biking, transportation, and construction, and do things that are quite progressive, including, like lowering the speed limits anybody to 20 miles an hour. They don't sign that very well. So people drive whatever speed, I have no idea. Yeah. And that. I don't know if it actually happened. It was at the point where there was a vote on it, it happened, there was signage about, we're going to cut over to 20 miles an hour in X number of months, and then the signage just disappeared. So maybe it didn't happen. not totally clear. And I don't even have quite as much attention to it. But again, yeah, they're willing to vote for the right things. And I think what's really missing is sort of on the ground, who's got the experience to make sure that in their implementation, all these policies are sort of happening the right way. And they're getting the first-hand experience of drivers. But there's a pretty substantial, I want to say 30 odd percent of households with no car that, you know, the point of view isn't necessarily experienced by anyone on the city council.

SDM Team: Do you feel like there's an opportunity for you either in your GSC role or in your role that reports up through the, you know, MIT transport committee? Do you get some input into that into MIT or city council decisions?

GSC Representative: Yeah. SoI know for a fact that MIT transportation folks are in talks regularly with city MBTA and state transportation planners **SDM Team:** Do you know how regularly?

GSC Representative: No, but I do know that they're, they know each other, they can begin, you know, make a call and get it and get it picked up. So we've definitely gone and written you know, open letter type statements about various transportation policies. And I'm sure they are read and, you know, considered, but you know, that's sort of the extent of the leverage that we have.

SDM Team: Okay. All right. Well, we are nearing our time, and you've given me so much content. So thank you so much. So is there anything else that you feel is important to this overarching theme of transportation and the Cambridge and Kendall area that we haven't touched on?

GSC Representative: One thing that I hear a lot actually is concerned about safety. I, personally have been living in urban areas for a really long time. And if you look at crime statistics, Cambridge is quite a safe place. But that doesn't make these safety concerns invalid. There are a lot of people who, especially later at night, are really worried about sort of getting around. MIT has some programs that help here, they have a safe ride shuttle, which is sort of point to

point. It's often quite slow. So that's the tradeoff you're making, you know, they'll pick you up, they'll get you exactly where you need to go. But you might be waiting for the shuttle a long time. You might be waiting on the shuttle a long time because there's enough demand that these things aren't gonna happen, you know, it's not a taxi. So that's something I don't necessarily have thoughts on. Exactly the solutions. But it's I think something that needs to be kept in mind whenever you're thinking about issues of transportation that affect students.
SDM Team: So would you say safety is one of your top concerns? Am I hearing that correctly?

Supporting Materials

1) MIT Transportation Options Overview:
   http://web.mit.edu/facilities/transportation/

2) MIT Commuting Survey 2018:
   https://ir.mit.edu/commuting-2018

3) MIT Sustainability:
   https://sustainability.mit.edu/tab/campus

4) MIT Sustainability Data Pool:
https://datapool.mit.edu/visualization/commuting-institute-story-access-mit

5) Cambridge Growth Plan:
https://www.cambridgema.gov/cdd/planud/masterplan

6) Kendall Square Study:
https://www.cambridgema.gov/CDD/Projects/Planning/K2C2

7) Autonomous Vehicles and Study:
https://mobility.mit.edu/av

8) Graduate Student Council Website
   https://gsc.mit.edu/

9) Transportation for MIT grad students
   https://gsc.mit.edu/transportation-guide

MIT Museum

Interview transcript: MIT Museum
Interview guideline link: here.

1. **Introduction:** We are SDM students (brief overview of SDM provided), and for this assignment, we are representatives of a hypothetical startup that solves large-scale problems. We have been assigned to identify stakeholders' needs concerning ground transportation at MIT and the Kendall Square area.

To do that, we have a few questions to understand your views and the position of the MIT Museum in MIT and Cambridge's future. We would like to learn more about the new location and get your perspective on the transportation system in the area.

2. **About Speaker**: Before we get to transportation, we have done some cursory research but would love to learn more about your background and role with the museum? How has the museum evolved under your tenure as director?

The current MIT Museum Director has been in his post as the director of the MIT Museum since he came to MIT in 2005. The MIT Museum has grown tremendously since he joined the institute. Currently, the museum is moving from its former location on Massachusetts Avenue (which closed permanently after the pandemic started) to its new location in Kendall Square. The museum is currently in the process of finalizing preparations and fitting out new galleries and exhibitions for the scheduled reopening in April. 2022 in the new location. The director actually took the meeting from his new office within the new MIT Museum building.

3. **Current location** / **Future location**: What is your vision for the MIT Museum and the Kendall Square Gateway? How do you see the Kendall Square location impacting visitors?

The current MIT Museum Director is excited about the museum moving to its new location. The Kendall Square Gateway puts the MIT Museum at the interface of MIT and the community of Cambridge. On the one hand, a museum is an administrative unit of MIT, and, on the other hand, it is an integral part of the wider Cambridge community. The location at the intersection of MIT and Cambridge in Kendall Square is ideal and aligned with the museum's intent to connect visitors and the community with MIT. The central gateway location allows the museum to be physically at the heart of campus, which is in stark contrast with its former location on the northern fringe of campus on Massachusetts Avenue. Also, the museum is now directly adjacent to the current (and new entrance) to the Kendall T station for local public transportation. It also resides directly opposite the re-positioned MIT admissions office, which makes it ideally positioned at the point of arrival for many visitors, families, and prospective students to MIT and Cambridge.

4. **Transportation:** How do you see transportation impacting the MIT Museum in Kendall Square? What does success look like for you when it comes to transportation?

The MIT Museum Director partitioned his view on transportation into two different critical constituents of the museum—staff and visitors. The museum staff's main concerns are not unique amongst MIT administrative staff. MIT staff generally need to commute or get into Cambridge to work on campus (post-pandemic). The T station is a principal method of commuting that the museum staff leverage (as it is for all MIT staff). However, the general problem on the staff side is the underlying economic challenges associated with the high-cost Kendall Square/Cambridge area. This is due to discrepancies in salaries for MIT staff, resulting in their inability to find affordable housing close to Cambridge (due to high realty and rental prices). This disparity necessitates some staff members to commute long distances, which is a problem for many MIT departments. The fact that the MIT Museum will be adjacent to the T station with direct access to the T makes it much better from a transportation perspective than the old Massachusetts Avenue location (where it was about a half-mile to the nearest T stop). There will also be a new underground car park available at the MIT Museum, which will help both staff and visitors who commute by car. Thus, commuting to the new museum location should overall be better for staff, but generally remains a challenge in Cambridge due to the lack of affordable housing in close proximity.

On the visitor side, the situation is very different from other parts of the institute. However, it bears mentioning the significance of the pandemic on the museum's operations and the uncertainty it continues to cause on expected visitor volumes and demographics. However, in the period before the pandemic, it is useful to note that the museum hosted over ~180,000 visitors per year, which were generally comprised of 3 equal-size groups, partitioned as follows:

- ⅓ traveling locally from greater Boston or Massachusetts to visit MIT
  - Generally, traveling by transit, bike, or other local options
- ⅓ visiting Greater Boston from other regions within the United States.
  - Generally, traveled by car or plane to visit the Boston/Cambridge area
- ⅓ visiting from other countries to the Boston area.
  - This consisted almost exclusively of international tourists that flew in except for some visitors from Canada.

Overall, transportation to the museum itself from wherever visitors are staying is via walking, local public transit, or car. This was a significant challenge in the old location vs. the new location, as it was not near a T stop or car park. The new location enables more local visitation, which is part of the plan of selecting that location in the first place. It is about as convenient from a local transportation perspective as you can be, so long as you have access to the T and Red Line. The new location adjacent to the T stop effectively lets visitors be dropped right off at the door. Also, a car park is available, but it will be expensive and would comprise a significant portion of the cost of the overall trip to the museum or MIT/Cambridge for many visitors. Post-pandemic, it remains unclear whether people traveling from outside the state or country will continue to travel in line with historical trends. Previously, they did not survey visitors specifically on how they go to the museum, but he imagined they would have taken the T and walked or taken a cab to the old location.

5. **Transport Pros/Cons:** What works well, and where do you see potential problems?

We covered some of the benefits of the new location earlier on, so the director focused on the cons or residual challenges.

The first issue he highlighted was the T is old and unreliable. The state of Massachusetts has a massive infrastructure problem to get the funding to enable T improvement. This issue is notorious with staff and even known or experienced by visitors. Anything that could be done to improve the T would be helpful to both visitors and commuting staff.
Second, the traffic situation in Cambridge is not good and is quite challenging for drivers. It seems that the city of Cambridge would rather you wouldn't be driving and continue to make provisions for biking. While he approves of the intent, it makes driving harder, and driving remains a significant mode of transportation and congestion in the area. However, these are not distinctive issues for the museum, but rather for MIT and Cambridge as a whole as traffic gets busy again with the economy and campus reopening.
Third, he doesn't know how visitors will respond to high car park rates. MIT owns the new car park, along with the other MIT car parks. Visitors will have access to the new car park (which is quite large, five floors deep) and will be able to buy short-term passes, while staff can purchase long-term leases. However, the rates will likely be very high, which will not help the museum from an equity and inclusion perspective. The museum has some advantages in this regard. Its busiest time for visitors is during the weekends when many students and faculty are not on campus, so it will have higher parking availability even if it remains unaffordable. This is the downside of being in a bustling area and an increasingly prosperous part of Cambridge. Kendall Square, in particular, is an affluent and expensive neighborhood for real estate.

6. **Transport Blue Sky Thinking:** Considering emerging priorities such as sustainability and technologies such as autonomy in transportation, what would ideal transportation options look like in the future? How do you envision the MIT campus and Kendall Square community's transportation system changing over the next 20 years?

The MIT Museum Director hopes that we will see a massive shift to more sustainable modes of transportation, principally electrically driven vehicles. In his opinion, it is incredible how conservative the transportation system has been when other aspects of life have been transformed more radically. For example, the T is effectively a 19th-century invention and is more sustainable than the 20th-century transportation system based on internal combustion engines. He has watched the rise of electric vehicles and, in particular, observed the development of an increasing amount of more sustainable smaller vehicles. He actually drives a little Vespa around campus, which is much easier to get around and navigate with than a car. While his current Vespa model has a small internal combustion engine, it is very efficient (relatively light), and he gets good mileage. He has also observed cities like Singapore, where scooters are all-electric, and this policy is obligatory. He thinks such policies and infrastructure would be a great asset in a place like Cambridge, where many people are in a confined area making numerous small short journeys.
In the future, he sees more people wanting to get around more easily, preferably with transportation options that are smaller and lighter. The problem with electric cars is that existing battery technology is heavy and requires a particular vehicle manufacturing and design approach. The advance of lighter, more efficient batteries could make vehicles more efficient and help power a transition to smaller, more sustainable vehicles at scale. He has seen some students using electric scooters and expects that population to grow and make bike lane infrastructure more important and highly utilized. Over time he believes such infrastructure

changes and consumer preferences will make it increasingly unrealistic to bring a sizable four-wheel vehicle to campus for commute or leisure activities.
Cambridge is also under enormous constraints to green itself based on its sustainability commitments. If you look at European countries, they have pedestrianized large parts of their cities, and Cambridge hasn't done that yet. It hasn't partly due to the tension between local and state control and the large roadways that run straight through the city center that the city has no local control over (i.e., Massachusetts Avenue traversing through MIT and Harvard is managed by the state). This dramatically constrains what the city can do by what the state is willing to permit or enable. However, longer-term, Cambridge's green politics will need to transform into reality and more green transport options. The T remains state-owned but only services the Eastern Massachusetts population, which tends to be wealthier. It remains a big dilemma and challenge for the Governor or other state leaders to propose to raise taxes or money in Central or Western Massachusetts to improve an amenity that benefits the Eastern part of the state (which already has more wealth and amenities than they do).
The director also mentioned he likes the Blue Bikes scheme but has no idea how well it's working. He lives in West Cambridge in Harvard undergraduate housing, where Blue Bike racks are nearby. He finds bikes in general to be a good idea and the most sustainable form of urban transport. In the future, he would like to see more electrically assisted bicycles become popular in Cambridge like they are in other places around the world. At the new museum, they will have bike racks and an internal bike garage below ground to store bikes, so visitors should be able to find parking. However, the scooter situation is somewhat different, and he is not sure how that works in other places, as he has heard there can be issues with people leaving scooters all over the place. So he believes infrastructure will need to grow to support scooters should they grow in use.
7. **Closer:** We are excited to explore the future of transport at MIT and even more excited to visit the museum when it reopens next year. Thanks for all your time!
The director appreciated the opportunity to contribute and stated that the museum serves MIT students and the MIT community and actively works with students. The museum will host classes and graduate student evenings where they turn over the museum to the graduate student community to do social networking and learning events. The museum is also open to student volunteers who want to learn communication skills and work in galleries with visitors.
Additional background research
Stakeholder profile
Director plans a new era for the MIT Museum
https://news.mit.edu/2017/john-durant-plans-new-era-for-the-mit-museum-0927
In this article, we learned about the vision from the Director of the MIT Museum and a member of the faculty in MIT's School of Humanities, Arts, and Social Sciences (SHASS), that aims to make MIT Museum have a deeper connection with the MIT community. He believes that science is very relevant to everyone's everyday lives, as he believes that "understanding science is necessary to make informed decisions on issues both private and public — from individual health care to national defense."
He has been realizing his vision through several initiatives such as an upcoming exhibition "The Enemy", which uses virtual reality technology to spark and stretch visitors' emotional and moral imagination. The museum also wants to introduce ideas and theories done by the MIT

community by facilitating these communication forms through galleries, classrooms, program and performance spaces.

Other resources

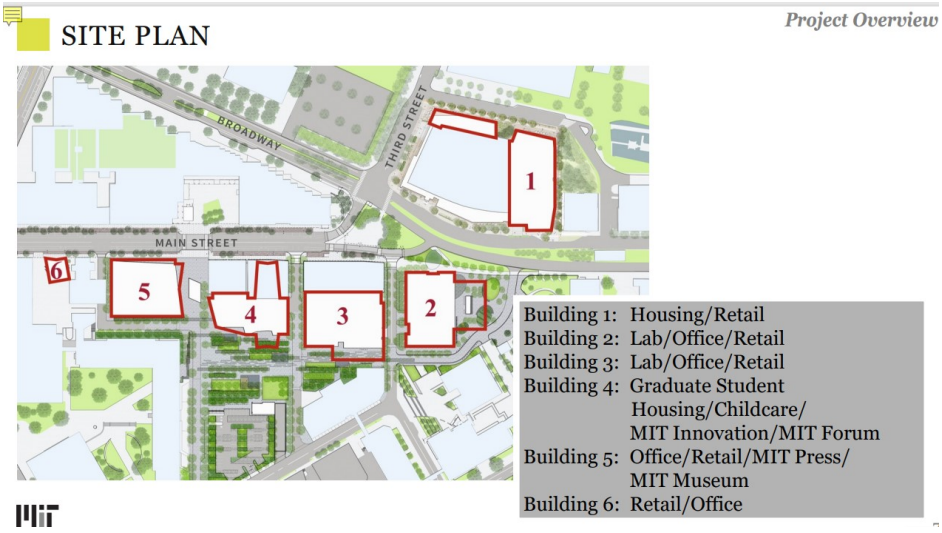
[Kendall Square at MIT Official Site | Cambridge, MA - coUrbanize]

MIT is bringing six former parking lots to life with office/lab, housing, retail and open space that fully leverage the Red Line and its location in the urban center of Kendall Square.

- Activate the Institute's East Campus with new public space, retail, housing, the MIT Museum and more
- Create new research and innovation opportunities
- Add hundreds of units of graduate, affordable, and market rate housing• Balance research & development with the public realm to strengthen the neighborhood for all
- Establish a crossroads for Kendall Square, MIT and the Cambridge community

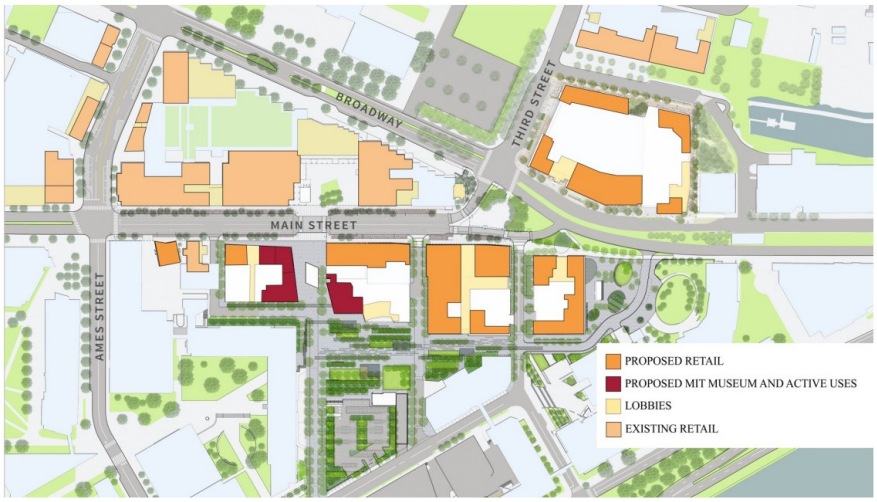
[Kendall Square Initiative (cloudinary.com)]

- New gateway to campus
- Diverse, active programming
- Public art
- Enhanced presence from Longfellow
- Active uses and retail on ground floor
- Improved connectivity



PROPOSED RETAIL

Retail Update



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ONE-YEAR LOOK-AHEAD

Project Overview

	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Phase 1: Utilities	Construction Begins – Utility installations through 2017											
Phase 2: SoMa Garage						Construction Begins – Excavation through 2017						

Phase 1:	Replacement/removal of utilities in Amherst, Carleton, Hayward, and Wadsworth Streets
Phase 2:	Excavation for below-grade parking garage
Phase 3:	Renovation of E38 (292 Main St) and E39 (290 Main St)
Phase 4:	Ongoing garage and building construction for new graduate residence, housing building, and office and R&D buildings

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Volpe Development Project

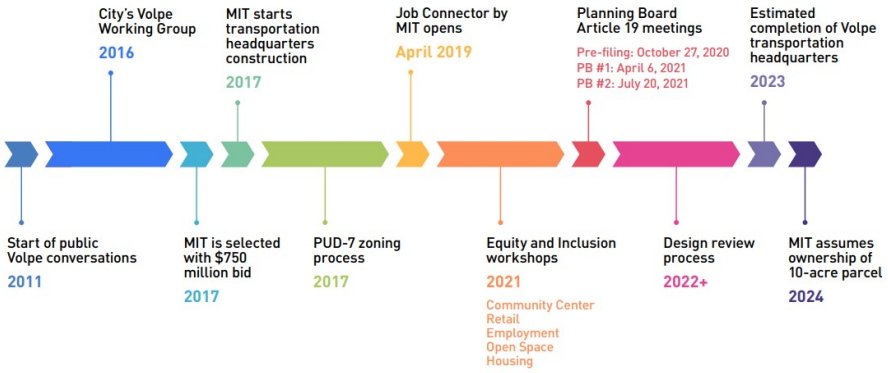
[Volpe redevelopment project launches next phase | MIT News | Massachusetts Institute of Technology]

MIT's proposal to transform the 14-acre Volpe parcel into a dynamic mixed-use development includes approximately 1,400 new residential units, 1.7 millions square feet state-of-the-art innovation and research space, 20k square feet community center, 3.5 acres of open space, and a concentration of entertainment, retail, and cultural uses that will serve residents, employees, students, and visitors alike. This will be a carbon neutral community.

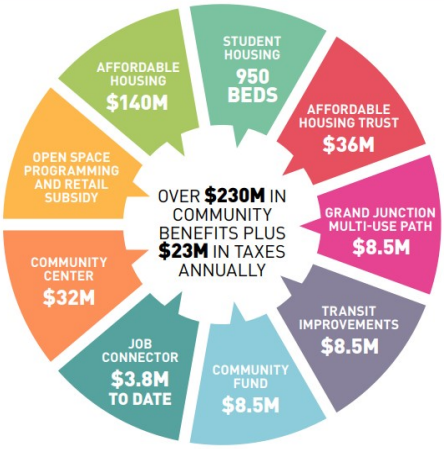
[First step on Volpe parcel planned for 2019 | MIT News | Massachusetts Institute of Technology]

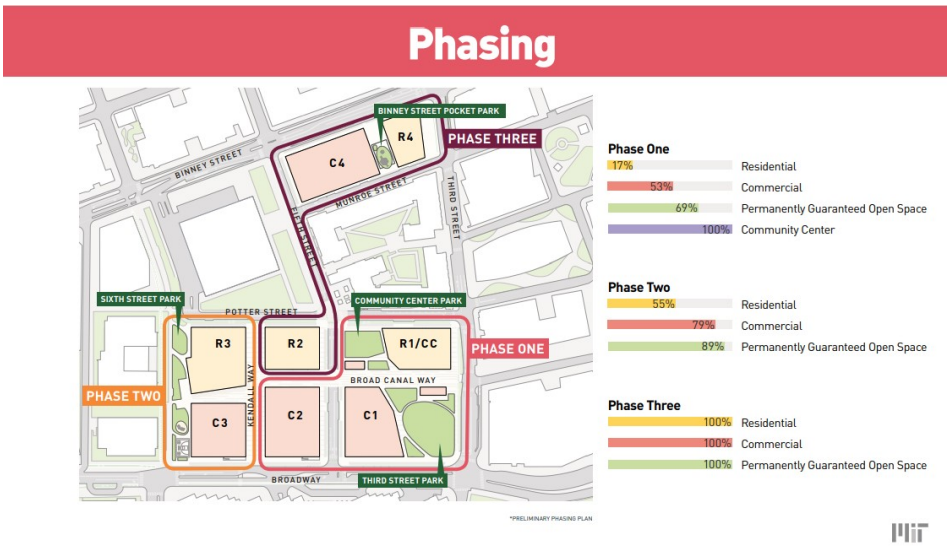
https://volpe.mit.edu/wp-content/uploads/2021/07/2021-07-20-Planning-Board-r24-compressed.pdf

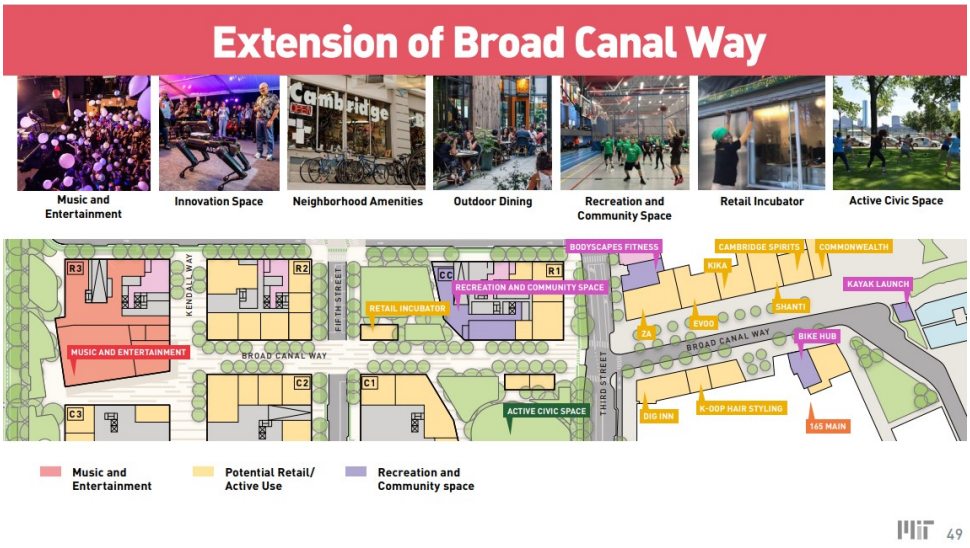
Ten Year Volpe Process



Community Benefits







http://web.mit.edu/facilities/transportation/

- Public transportation - MBTA subway, local bus, shuttle (weekday, evening Saferide, speciality), Bluebike, ERH (Emergency Ride Home) program
- Private transportation - car, motorcycle, bike, walking
- Ride sharing - Carpool, Zipcar, Vanpool

Other options - Uber, Lyft, taxi, e-scooter service; roller/inline skates, skateboard

Biking Diaries of a Graduate Student https://gradadmissions.mit.edu/blog/biking-diaries-graduate-student Pradeep, The Chemical Engineering PhD student thinks that bluebikes are a great option for short trips, but he claims they are not comfortable for a more than 20 minute trip. This became a barrier for him to go outdoors during the weekend, making him stay at home most of the time. One day, he realized the reason why he rarely goes outdoors is “the absence of a comfortable, inexpensive, personal mobility option”.

Things changed when he finally got himself a bike. The bike would enable him to explore more of the surroundings; discover new roads, new buildings, new restaurants to try out and some little gems. He finds himself some cool biking routes that he can try out. He now settles his new

routine; to take longer miles when he is on his way back home. This activity also enabled him to work out, reduce stress, and help him discover new places he did not get to dio previously.
Follow up question:

- What caused him to think that bluebikes are not comfortable for a more than 20 minute trip, but his personal bike does?

Policy for Bike Owners https://handbook.mit.edu/bikes
What is not prohibited, as quoted from the article:

- Bicycles found illegally parked or attached to stairway handrails will be removed by the MIT Parking and Transportation Department. In order to obtain the release of your bike, you will have to go to MIT Parking and Transportation (W20-022) and pay a fine.

- MIT is not responsible for damage to your bike or lock.

- **In Institute buildings or parking structures, it is prohibited to operate bicycles, in-line skates, skateboards, or any other form of wheeled personal transportation** except for medical devices such as wheelchairs and scooters. A fine will be imposed. ○ Only wheelchairs and scooters are permitted.

A "far out" take on transportation planning Eric Plosky '99, MCP '00
https://www.technologyreview.com/2021/08/24/1030594/a-far-out-take-on-transportation-pla nning/

CIC – Cambridge Innovation Center

Part 1

Interviewer 0:00
Okay, so my first question to you, **CIC *Interviewee*** is just how long have you been in the Cambridge/Kendall area for?

CIC *Interviewee* 0:10
Sure. Excuse me. So I've worked at this location for about five years now, ah and yeah each, each year, has been spent here in the Kendall Square area, right here on One Broadway. So that's it I don't know what else to say about that it's been five years and it's been great so far.

Interviewer 0:31
Okay. Did you move here or have you always been in the Cambridge area

CIC *Interviewee* 0:35
Yeah so I don't actually live in Cambridge I live in Somerville, formerly in JP formerly in like the Back Bay area. So, for the duration my connection to Kendall at least I've not actually lived in the area. I have and I'm not from Boston either I've lived here for about 11 years but I'm from South Dakota originally I came after college for to pursue a professional opportunity here, and then have been with CIC itselffor the last five years.

Interviewer 1:03
Awesome. Okay, I used to live in Somerville, as well, about six years ago, over in Winter Hill.

CIC *Interviewee* 1:10
Yeah I'm on Spring Hill. . .

Interviewer 1:14
Gotcha

CIC *Interviewee* 1:15
Not bad as a neighborhood I miss JP though.

Interviewer 1:17
So, just a little more about CIC. What's your position, exactly here?

CIC *Interviewee* 1:21
Yeah, so I'm what we call a community leader, it's the equivalent to an operations manager. And with that I lead our coworking specific community here and client offering here on the fifth floor of on Broadway. So the space that I manage, is just out here behind us through this kitchen into that open desk office space over there. And I've been in that role for about two years now. With that I manage a team of four people, to provide client support and logistics, as well as Operation support as well. So a lot of office management things a lot of event management as well and a lot of like technical IT on the day to day, that we've offered to our clients. So, and within this, this particular space. Right now we have about 312 individual members and something like 250 some clients, which would be individual businesses that use the space that I managed personally. But, there it's much higher than that throughout the building. We're on six different floors in one Broadway.

Interviewer 2:31
I'm sorry, can you just repeat those numbers again?

CIC *Interviewee* 2:34

it's, yeah, so within this space that I directly manage. Okay, it's something like 312 individual numbers, that's a one person. And then, for as far as the clients that's like individual companies it's something more close, more like 250 this time. So our business is still recovering from the COVID pandemic. But we are seeing that kind of kick in membership and new, new people coming into this space. As far as the number of clients and individual members that we have in the building as a whole. I don't have the numbers the updated numbers. Prior to the pandemic there's something like 700 companies, or members here at CIC, but I don't know where that stands as of now.

Interviewer 3:19
Okay. So those clients, could you tell me a little more about how they actually use this space, in particularly Kendall, you know, are they here every day? Are they here just for a certain number of hours, do they have like a one-year lease through you?

CIC *Interviewee* 3:33
Yeah, so the answer other than, other than the lease question the answer that is yes. We have clients that are here every day. Many of our members are here, what as far as I know, seven days a week working from our space. But then we also have on the other extreme. We have members that are international and have never set foot in CIC and essentially use this space for the business address. So it really varies based on the size of the client and varies based on where they are in their own life cycle, it varies based on, like, the industry that they're in. It varies on the time of year, even for some of them. Many of our parents they come in more during the school year and less during the off hours, or the off, off time of the year. But we also have, we have businesses that are upwards of 200, individual members of their company that are here, like, members of the team are here on a rotational basis but never maybe none, none of them are here all at once, and then we have everything to just like a single person company that's just a startup phase like pure startup phase, and their usage is like really variable, so to answer that question, it's, it, the answer is it depends. Okay. And as far as our leasing system is concerned we actually, we do a 30 day service agreement. So every client whether they have 200 employees to just that one person company, like I mentioned, they're all on a 30 day agreement. So they can terminate with us at any time. They can reactivate it anytime somebody, depending on the size and like the offering that they're, they're participating, they can pause their membership for up to six months at a time, go abroad, come back, and then reactivate as well. So, we offer a lot of flexibility, and that's honestly what a lot of our clients are drawn to they'd like the fact that they don't they're not locked into a 3, 5, 10 year lease, in an office space, especially in such like a prime environment.

Interviewer 5:33
Would you be able to give me like a ballpark of like the percentage like the clients use it like Monday through Friday like 50% ish or, you know, something along those lines?

CIC *Interviewee* 5:42
In terms of occupancy or in terms of like, just days of the week,

Interviewer 5:44
Just like usage so like what we're, like, trying to understand is, you know, the transportation system around here right so understanding like when are peak days and nonnon peak days.

CIC *Interviewee* 5:59
Sure, so this is a, this is really more anecdotal, I would say at this point. But I would say Tuesday through Thursday, are our busy days of the week, and people given that, excuse me, the pandemic has introduced a lot more flexibility into many people's working lives. I think many, many of our members are taking advantage of that to stay at home or work elsewhere. Mondays and Fridays. Okay,

Interviewer 6:23
Awesome. So, you know, like you spoke about your position a little bit just kind of wondering what challenges like you've seen in like the Cambridge area like that are like specific to here with like whether it's like logistics or getting clients to like occupy the space or member sign up.

CIC *Interviewee* 6:43
Yeah, I mean, I think a lot of it has been just the changing expectations with the in relation to the pandemic. just how much uncertainty it's added to people's lives has really made it difficult for people to decide whether or not they want to hold on to office space right now, whether it's the best thing for them. I think, also, a lot of people are discovering that they can work from home in a reasonable way that, like, they don't need maybe a footprint in an office environment anymore. But then on the other side, many people are discovering, you know, oh I actually hate working by myself at home and I need to be around people at least some of that time. So I think one of the things that we really got us that particularly relates to the pandemic, was when the mask mandates indoor mass mandates were lifted, we started seeing a huge increase of returning people, whether for whatever reason, people just really did not want to wear a mask indoors, through the entirety of their work day. Even though the like are far and away the largest majority of our clients are fully vaccinated, they don't want to follow that additional COVID safety protocol and indoors.

Interviewer 8:01
So just, you know, going back so CIC from what I understand started up in 1999. Obviously, you said you've only been here for five years but, you know, other than COVID what other challenges regarding like transportation around here like, have you seen and, you know, do you know like what might have caused them.

CIC *Interviewee* 8:24
Yeah, I think, particular for our members or clients that live outside the city limits, the lack of parking or the limited parking in the area has been a challenge for many of them. I know many of them when they come in a few days of the week because of parking and how expensive it is the, the pressure that that creates. Alternatively, the lack of transit from some of the towns and suburbs and the passing area to Kendall Square. I mean, I would, I would imagine if say like Newton had a really quick fast transit from there to here, many more of them would find that they don't actually need parking they could just ride transit into the space and they would be able to visit more often. I think that it's like, kind of like, both and there's a bottleneck and the fact that there's not enough parking for the folks that want to is that cheap enough for them to make it economically feasible to have both an office space here and a parking space that costs almost as much. And then there's also the bottleneck and the fact that our transit is, although we have many subway lines we have a decent number of lines out to the suburbs, even those are like limited in the way in the way that they only reach in certain areas or certain sections of the of our suburbs and they're also designed in such a way, it's like a hub where everything goes into the center of the city and then you might have to make a transit transition from there back out, which just takes a lot of time and it's hard on people.

Interviewer 9:56
You spoke a little bit about the parking being an issue. You know how many of the clientele, or at least what you can speak to needs parking access, and currently at the moment isn't able to get it?

CIC *Interviewee* 10:14
Yeah, that's hard to, hard to say as well, I think, again, it's going to depend, we have with this building with One Broadway and the parking service that they have on offer. We have a certain number of seats, or parking spaces that are set aside for our clientele. Right now they're currently all booked, and that's actually pretty standard is that there's like a long wait list for members to have access to a parking space within the building. But we also keep on, keep on record a list of all the available parking garages in the area just to pass off to people who might need like a day, day Chase or ticket or to pursue parking. Parking Spot elsewhere on a monthly basis. So it's a pretty frequent request I couldn't, I couldn't by any means put any like percentage or like guesses on like the number of our clients that need that is just as many of them that are parking. I also know bike, or use east gate or other motorized like means of traffic that doesn't require a parking pass. So, yeah, I can't give you a firm number on that.

Interviewer 11:20
I'm sorry. Where do you say that the parking garages for here?

CIC *Interviewee* 11:25
There's one here at the foot of the building actually it's just here on Third Street.

Interviewer 11:26
Okay, got it.

CIC *Interviewee* 11:27
It's part of it's within the building itself.

Interviewer 11:33
Okay, so like the commute, once you know the client or whoever's working here is parked there it's not like a long walk to get over there?

CIC *Interviewee* 11:43
They're parking here in the building. If they're using one of the other graduates, like green, or one of the other. Yeah, there's an area maybe a little bit longer, so far as they know anyway must have parking garages or within a 10 or 15 minute walk from there to here.

Interviewer 12:01
Okay. So, what would you say is like the difference like obviously weather plays a factor here in Cambridge, but how do you see the weather like impacting challenges in the winter and fall in like versus spring and summer? You mentioned before that, you know, during the summer months, you know clientele isn't as heavy because most people want to spend time at home with their, their kids.

CIC *Interviewee* 12:29
Yeah I would say well, weather also impacts, like industrial traffic or people that are using like bicycles, scooters, e-bikes, e-skates, things like that or walking, people are less likely to walk, bike, etc. In the height of the heat of the summer and also much less likely to do that and then of course, responsible for the winter or if it's like a rainy, cold miserable. Fall or Spring day that we get here in new englad so, so often. So, and those in the days like that people are then like either taking the bus or the train, and particularly in the wintertime, I think, if you've lived in Boston for any amount of time and you know that the red line the buses there, They can be heavily impacted by winter weather, which leads to delays which leads to people not being able to get into work.

Interviewer 13:24
Okay, so transitioning over a little bit more into our topic so I believe CIC was started by two MIT graduates. .

CIC *Interviewee* 13:36
Yeah, right.

Interviewer 13:37
So just kind of wondering like what the current relationship is that CIC has with MIT. And if you know any bit about like their community relations with MIT?

CIC *Interviewee* 13:48
Yeah I mean other than the fact that MIT owns this building, and many of the buildings in the area are served as sort of a de facto landlord. I think MIT also has like a pretty large, say, in the development of the area, whether like a building gets built or not and like whether or not, like, especially as like a large property or land owner in the area, and it has a lot of sway in that way. I think it's also just like a very well established and wealthy player or institution in the area that has a lot of political clout in that way as well. But beyond that I know that CIC partners with MIT pretty frequently.We host the MIT Sloan Alumni Association here, they are essentially a friend of ours, a couple friends of CIC so they have space that they don't have to pay for. We host it, we partner with them to host events and things like that. Similarly ,the Kendall Square association I believe the MIT staff or as an institution has a presence on that and we have, we share a presence on that, that board as well. And that's, that's, that's an

organization that gathers many of the businesses and other stakeholders in the area to put on events for the community discuss like the shape and tenor of what's going to happen in the community. Supports one and another offers programming, things like that. So MIT also has a space on that that CIC occupies as well so there's a collaboration, partnership to do that as well.

Interviewer 15:20
Could you speak to like any of the differences, you know, particularly regarding like transportation and maybe logistics that I know there's another office in Boston, is that correct, you know that Boston faces or doesn't face that we, that you do over here and Cambridge?

CIC *Interviewee* 15:38
Yeah so I think Boston. Boston is lucky or Boston is positioned in such a way that it's like much closer to many of the terminuses does have, or like central central like Central Station sort of many of the T lines and subway stations, and also the commuter rail. So, they are close enough to many of those stops, and money that into infrastructure that actually enables many more people to get into, into space much more quickly, but also it serves it serves people that are on the south side of the city, whereas many of the people that are that are coming here are either in the Kindle area in the Cambridge area Somerville, Arlington etc, but also further north of the city or west. And I think more of the clientele on that side comes from the south side of the city, so it was just a weird thing about the river dividing Boston from Cambridge that like people will not cross one way or the other. So, yeah, and then I think there's also more available parking in the downtown Boston area, but that is constrained in the fact that like, like traffic in downtown Boston is also a little bit heavier. So, they have more access to public transit, which is really helpful.

Interviewer 16:53
Okay. Got it. So when you think of transportation to Kendall Square, what's the first thing that comes to your mind?

CIC *Interviewee* 17:03
I mean, for me personally I think biking is because I biking to work every day. I think from a perspective of our clients I think of parking and I think of the subway.

Interviewer 17:18
Would you be able to like, estimate the number of people who park versus take the T, into here.

CIC *Interviewee* 17:29
Yeah, I don't have now with any level of accuracy that I would trust at all. Our, our access cards or key cards that we have. They also serve as a Charlie Card, so they can double up as both a key into our space or into their private office but also be used as a passing of the subway station. And that's just something that we give to everyone, but that doesn't give me any indication of how many people use it as a transit card or a subway pass. So we, that's not something that we track. I don't really have good data to give, give you an answer to that.

Interviewer 18:06
Is there any need for clients to go from an office space over here or from over here into Boston, and like, if so, what's the best way for them to get over there?

CIC *Interviewee* 18:19
In terms of, like, moving their, their, their central location or having an office in both spaces, or just needing resources from one and the other?

Interviewer 18:28
More so like needing resources like from the other word just, you know, maybe they have a meeting over there or something like that when you know they're typically located out of one of these buildings

CIC *Interviewee* 18:40
Yeah I think there's like a variety of ways that people get from one to the other, whether it be the redline T, or a lot of people use ride hailing services ride shares, things like that so your Ubers your Lifts. I think fewer people drive if they're if they're Parker drive from here to there, but it's, it's possible that some of them use that that service as well.

Interviewer 19:16
So you mentioned that CIC, you know, has Charlie cards with in the pass is that something that CIC like pays for?I know MIT has the Charlie Card ability, but I have to actually add the value on to it, or is it prepaid?

CIC *Interviewee* 19:43
So we don't we don't offer like a travel stipend for the charlie card we don't put money on it for them, that's something that they have to do for themselves. Similarly, while this, I guess this, this is no longer the case is now defunct but something really if they ever lost the card and had money on it, they'd have to manage that through, through the MBTA itself. But I think they're phasing out that that type of Charlie card pass tothe new type with maybe like they changed all the readers on the turnstiles from the rectangular use the circle type and the circle type doesn't recognize the old former Charlie Pass, which is what we use for our access keys. So sooner or later, they're going to become obsolete unless we upgrade our key pass situation.

Interviewer 20:29
Got it. So you mentioned that you bike over in here. Is there another option, like you'd be open to taking such as like a bus or autonomous vehicle that was something that was created in the area?

CIC *Interviewee* 20:49
Yeah, I mean, I do, I do take the bus from time to time I'll walk, I take the T as well. If my roommate has a meeting or is driving for the day I'll ride in with him as well, and he has a parking spot with his company down the street. So I think any of those if I'm like you know, I have an early morning meeting and I have to make in the morning I might do a rideshare as well. The autonomous vehicle I mean those things aren't on the street yet I'd be willing to try it. I'm a little less. Personally I'm a little less drawn to single person cars, more interested in public transit.

Interviewer 21:33
Could you just explain a little more on like why you're more interested in public transit?

CIC *Interviewee* 21:37
Yeah, yeah I mean I think it's, it's better on the environment. I think that we should be as just as a democracy should be about investing into publicly held infrastructure. And I think it's something like our that's kind of our government's mandate is to provide publicly accessible services that get us from point A to point B in a timely and efficient way. And I think that the more individual based car system like promotes more consumption and promotes more of like an individualist look or Outlook on transit system that can be avoided by using more public resources.

Interviewer 22:19
Just to go back to a little bit, you know, you mentioned you also bike and as well. You know what some of the logistics that goes into like when you bike ride so like, , how is it with, you know, riding on the roads and as well as actually finding a spot to place your bike and know it's in like a secured area?

CIC *Interviewee* 22:40
So are in terms of parking the bicycle itself there we offer a bike cage at the foot of the building that's lockable. So our members can have access to that through their, their membership pass. So that's something I use every day when I bike. Many of our members do as well. There's also more public available publicly available bike, bike stands outside as well and across the street and elsewhere around the square. So that's also something that I could use a third one and for me personally, the route there are a couple of routes that I take are impacted by construction right now, particularly in Immansquare for they're up in Cambridge, they're, they're tearing up the

entire intersection right now so it's in the last six months or so, they've even torn it down to where it's just like bare gravel, so that's been really difficult at times and has felt a little unsafe to be on a bicycle. So just like road conditions itself is something I take into consideration when I'm taking a bike. I'll also say that like now that people are back on the road again post pandemic. It seems like they have, you know, kind of forgotten how to drive in a safe conscious and considerate way So, Boston has always been a little bit aggressive in terms of drivers so safety is definitely something to keep in mind. So, I like to only be on the roads that have the dedicated bike lanes.

Interviewer 24:12
So, I don't know if you like ever need this or if you know anyone who bikes in if they need to go to like another area of Cambridge or if they need to, like I said go to the office in Boston, are they using that rideshare or are they biking there or are they using some other transportation? Could you expand upon and like, possibly why they might choose that one over.

CIC *Interviewee* 24:36
Yeah, so my assumption is, again, this is an assumption. I'm assuming that most people are using either using a rideshare for, like, just because it's quick, it's readily available often or usually anyway. And that when they get there they don't have to concern themselves with parking or anything like that they can just go door to door, somewhat affordably. Either that or they're using the T, again because it's it's right here in the heart of Kendall Square, and takes them basically to the doorstep of the 15 McCulloch location as well, or within a 10 minute walk. So I think it's like a matter of convenience, it's a matter of ease it's both easy to get to the Tstation here in Kendall Square and it's both easy to get from that T station in downtown Boston to the Boston location with relative reliability, it's fast and it's not hard to navigate. Versus parking however I think,parking is such a it's a, it's a challenge here in Kendall, it's expensive, it's not always available and I think it's also a challenge in Boston, it's expensive and not always available so don't think that people are taking a car from one parking space here in Kendall to another in downtown Boston and risking either not being available or not being available in a timely way, and also just like doubling the cost of that parking by having a reserved two spaces in a single day.

Interviewer 25:53
Got it. So, you said you are obviously open to the idea of like autonomous vehicles, preferably something with lower emissions, it sounds like based off the public transportation. Regarding like your clientele. How many of them, do you think would have a need to use something like that, you know like a new sort of surface level transportation that's ideally autonomous and emissions free or at least environmentally friendly.

CIC *Interviewee* 26:36
Yeah, if it were readily available and like easy easily accessible. I think most of them would find a reason or need for it at when you give any given time, or one time or another. I think of transit is like a perennial issue and like people need to get places so if you can provide a service for them that they are like suits convenience and is also conscious conscientious and aware of like how it's impacting the environment like people are going to take it. And it also kind of speaks to like if autonomous vehicles are readily available and you don't have to worry about parking, then people are going to take that option over to having to drive their own car because it limits their own personal cost and they don't have to deal with the inconvenience of finding parking.

Interviewer 27:22
Awesome. Would you say they currently have a need for it, or are they like, able to get by just fine by, you know, driving in parking and walking or, you know, using the blue bike or ride share like you were saying?

CIC *Interviewee* 27:37
Yeah, I mean I think that I think the need is being met with current systems but I think we would like if you build out the infrastructure, then that is like a niche that could be expanded for for this autonomous vehicle, like the current systems that we use right now are in use because the infrastructure is there for them, but do you build the infrastructure for an autonomous fleet is like either electric or based on hydrogen or something that that's a little bit kinder in the environment and that suddenly becomes readily available and convenient for people, they're going to use that and to meet their needs instead.

Interviewer 28:11
So wrapping it up a little bit more but like in your mind what would be the ideal or best transportation system to have here, and that you know, getting around of Cambridge, and wherever else you need?

CIC *Interviewee* 28:29
Yeah, that's a good question. I do think like public transit is part of that equation I think our current subway is decent, but could be better could be, could stand a little bit more investment and upkeep, but also like could have more routes or more access to different areas, particularly around, Cambridge, Boston and some, some of the neighbors their neighborhoods, they're in. And if it came more frequently people would use it a little bit more often and if it was cleaner people use it more often. But in addition to that for like full, full full full access to like far regions in Cambridge, I do think that like the ride hailing thing or if there were an infrastructure for an autonomous fleet that was used on demand, and could take you where you like a pre-selected destination, that would be something that people would be very interested in using.

Interviewer 29:28
what do you think you're like the clienteles thoughts on that would be?

CIC *Interviewee* 29:35
I think they'd be very interested in I think we have a clientele that's like very tech savvy and also very supportive of innovations in that way. Particularly if you're, you can also pitch it as something that's like environmentally friendly and easy, convenient, fast, and preferably cheap.

Interviewer 29:59
What's your thoughts on the blue bike system that they started up here in Cambridge do you see a lot of clientele using it?

CIC *Interviewee* 30:06
I don't. I have seen a few of them use it but I don't know that it gets a high rate of usership by our members I think the folks that are interested in biking have their own bikes.

Interviewer 30:25
How is biking, like during the winter and summer? Is that a major concern for your clientele.

CIC *Interviewee* 30:32
Um, I think, I think most most bikers in the wintertime, give it up for a few months, just because the weather is prohibitive and it becomes less safe.

Interviewer 30:41
What do they do they switch over to?

CIC *Interviewee* 30:45
I imagine many of them at that point either start using ride hailing more often or driving if they have their own vehicle or using public transit.

Interviewer 30:57
Got it. And then, same thing for like the summer and the hotter months?

CIC *Interviewee* 31:04
Um, yeah that's a good question. I think some of them just have tough it out, I do think some of them switch over to more ride sharing or public transit and things like that or their personal vehicle. I do think also, some people just decide not to come in.

Interviewer 31:22
Is that an issue for CIC like during the summer months?

CIC *Interviewee* 31:27
I mean it does get to be a little slower around here, but it's, it's not that people give up their membership or stuff like they don't, they don't stop there. They're there. They're not. They don't leave as a client. Typically, it's just that they, they come in less frequently, which is their choice. We're still here to support them as a member when they are here.

Interviewer 31:49
Awesome. Could you speak to like some of the like day to day challenges you see regarding being here and like the Cambridge Kendall area? You know, I know you have kitchens and things like that. So are there issues with like food delivery let's say we're just, what are some common issues?

CIC *Interviewee* 32:10
Yeah, so we'll related to food that all comes through our loading dock which is at the street level, and we share it with both the with both MIT with the restaurants that are at the foot of the building with the grocery store that are at the foot into the building as well. Excuse me, so there can be there can be pressure on use of that space just because there's so many people that are demanding it. And they have like such a different variety of things that they're, they're offloading from different trucks and things like that on a daily basis and basically all hours. And also, also the fact that they're coming in off of public fairly high us street sometimes that can create a little bit of traffic snarl out there, just getting in and out of the dock that garage space. So that's sometimes leads to like delays and deliveries and things like that, which is a challengeethat we have to overcome and be adaptive for. But other challenges in like the Kendall square area. Construction is a big one, there's been so much construction in the area that's really cause either delays and traffic, or, you know, reroutes and like pedestrian pathways and things like that, or even a closure of businesses temporarily. It's created a lot a lot of noise and noxious like noise pollution and things like that that impact people's ability to just be in the square, or be outside in any way, or even work in their private offices, sometimes the construction noise comes in and disrupts the working environment. And, I mean we recently got the grocery store at the foot of the building but prior to that this, this area was nice, you were eating out there wasn't really a lot of options for food. And even now, I would say there are, there aren't that many options for food, unless you're willing to go to the same like four or five places, day in and day out, week after week. So I think that's, that's something that impacts like the livability of the space, or this area. Yeah and there's just like other than the, the, the subway station right there, there aren't very many bus lines either, so if people aren't going, if they're their health condition it's kind of it's kind of difficult for people to quickly and easily get from point A to point B, because I believe there's only two bus lines that come through here the 64 and 85. And another thing I will say is that someone whotakes ride sharing or ride hailing from time to time. At peak hours it can just be prohibitively expensive it can be like a $50 ride for somewhere that's not very far away, which is discouraging.

Interviewer 35:03
So you mentioned a little bit you know there's limited restaurants in this Kendall Square area particularly. Could you speak a little more to like, what your clientele does like for lunch. You know, are they having to walk to lunch, you know, during the winter like does that deter them?
CIC *Interviewee* 35:25
Yeah, yeah, many of them, I mean, some of them do bring their own during lunches and store it on site, but many of them are going out to eat in the area. So, you know, many of the restaurants are a little bit further away there's some that are nearby, but a larger portion of it, are at least like five blocks away. And then during the winter time that does impact people's experience with wet slushy ground. Cold, windy. The wind tunnel here that is Kendall Square. So that can be unpleasant and can also discourage people from actually trying to do that or wanting to go out to eat. I do you also know that many of them go to the grocery store to go pick up the meal pick up something that's pre-prepared, or pick up ingredients for something that they make on site. But yeah, weather, weather certainly impacts people's food choices in the area. So like if it's a rainy day, most likely people aren't leaving this building. They might go to the restaurant, within the building itself.

Part 2

Interviewer 36:00
Okay. Could you tell me a little bit more, since you've been here for five years, how have you seen transportation develop? Has it been better or worse?

CIC *Interviewee* 36:16
Yeah. Excuse me, I think since I've started here Blue Bike is like a thing that they've installed or started since then so that's just like another option. Again, I don't think our clients use it all that often, but it's like, never hurts to have more than one available. And as it's developed over time, I mean, they've added more of these protected bike lanes on either side of the building which has been a great addition I think more people are biking as a result of that they've made the walkways, especially down this main drag here a little bit more aesthetically pleasing, which I think has led to more people walking, they've added some like the infrastructure but be it more restaurants, the grocery store things like that that make the space just feel like more human focused, and a little bit more pleasant to be around. I think that leads to more people being outside and moving in and milling about the square, because there's more amenities for them that they can then go pursue and take part in. Transit, specifically, other than the bike lanes and like rerouting some of the roads in this area. There hasn't been a whole lot of development, said the largest one is really just this, they did a ton of construction on the road right out here, leading up to the bridge. So they added new pedestrian walkways they added new bike lanes, they widen the road a little bit, and then added like a center divider between the two lanes, which I think really again made it more aesthetically pleasing but also safer for pedestrians, which I think has led to more foot traffic, and made it, made the driving experience a little bit cleaner, clearer, and quicker.

Interviewer 38:04
What would you say is like the distance that a typical CIC client needs to travel when they're here for the office like once they're here, they're set they don't need to travel, or they need to go up to like five miles away all the way past Harvard?

CIC *Interviewee* 38:22
Yeah I mean I think once they're here most of them are kind of locked in for the day though for the city to have to travel, it's just a few blocks to get some food for lunch, if they didn't bring anything in. But, you know, maybe some of them are going to a meeting elsewhere, whether it be another business nearby or university across town or something like that, that might happen. I do know that many of them actually just host their meetings on site because we provide a lot of infrastructure for them for that. And a lot of support to make board meetings possible and things like that here. So I think, most of them unless once they get here, They're here for the day and they're staying within a relatively small block radius. It's really, when you travel from here to home or from home to here that you get the longest distance. And that that's going to vary as well I think many of our clients are coming from suburbs outside the city. So you can like several miles from there.

Interviewer 41:21
Got it. So you mentioned, obviously, like there's an array of different types of transportation they use, but is there one in particular that you think might be best?

CIC *Interviewee* 41:47
For our clientele, I think. Yeah, for our clientele, I think that public transit, that's available here is probably something that's like the best because if we do have clients that are coming from the south side of the city, the red line gets them from some of the major subway stations down there. And then there's also the red line that stops along many of the pretty major spaces of the city to including, you know its terminal at Alewife , many of the people that are coming from Northeast city and the suburbs. There's plenty of parking right there at Alewife they get off, get on the red line, subway station, and take it all the way in and it basically brings them directly to our doorstep. So, if I had to guess I would say public transit is like the big the big winner for us in terms of moving places that people from wherever they're coming, coming from to our, to our doors.

Interviewer 42:43
Has CIC had any participation in like the Cambridge communities like boards regarding public transportation or any influence over that?

CIC *Interviewee* 42:53
Good question.

Interviewer 42:54
I know you mentioned that, you know, you don't put any money on the Charlie Card but it is available for them to upload to it. But do they have any sponsorship with Blue Bikes or some other sort of transportation system?

CIC *Interviewee* 43:09
No we don't. Not that I'm aware of anyway I don't think that that's something that I think that may have been something that we experimented with in the past back when there was like a few more ride sharing and sharing companies before the Lyft and Uber kind of dominated that space. But as of now, we don't, where there's no sponsorship that we're currently part of in terms of being a part of boards that are influencing traffic decisions in the area I don't think that that's something that we have much of a hand in either not as like an official capacity as a company. The biggest board that we're a part of in the area is the Kendall Square association which is more of a non-governmental nonprofit that's running more culturally based initiatives in the Kendall Square.

Interviewer 43:56
Can you tell me a little bit more about that? Like, are there any projects that I'd be familiar with?

CIC *Interviewee* 44:05
The Kendall square challenge that happens every spring is like a networking and fundraising opportunity or event, where they do basically like, Track and Field games in the area, with different teams from different companies that are on the board, just to raise money for nonprofits of their choice or causes of their choice. So it's really more of like a way to build community and also do some good for the area.

Interviewer 45:35
Sure, not to beat a dead horse, but I'm sure there's quite a lot of traffic that comes in for that event every year. Can you speak a little bit to the traffic and how most people get here is it through walking from close by neighborhoods of Kendall, or are they taking public transportation via the T or parking here?

CIC *Interviewee* 46:00
To that specific event or just in general.

Interviewer 46:03
Just in general, those types of events.

CIC *Interviewee* 46:06
Yeah, I think it's a I think it's a bit of an all of above, I think, particularly on weekends, people are taking more public transit or ride sharing. I don't know that people are parking in the area as much I think there's like, I think there's less of that that happens in the weekends. But yeah, throughout weekdays and things like that, it's a bit of all the above. People are walking, people are biking, people are taking Ubers Lyfts, what have you, people are taking the public transit and people are driving in or carpooling.

Interviewer 46:38
I forgot to ask this question but does CIC charge the clientele, in addition to park here?

CIC *Interviewee* 46:45
We don't. The company that manages the parking garage at the foot of the building does.

Interviewer 47:00
I know that parking around here, especially in the garages can be very like hefty, like, from $35 to almost like $50 a day. Do you think that'd be a major decision for clientele, to switch over to some other sort of system for commuting?

CIC *Interviewee* 47:20
Yeah I think so because, for like this garage space here it is like $400 a month. So you're getting to the cost of like almost half a month of rent for an apartment in a multi person apartment here in the Somerville, Cambridge area. So that just becomes prohibitive so many people are not parking in the area because they just can't afford to do both. So at that point they're going to switch over to something else, whether it be, again, bike, ride sharing or taking public transit.

Interviewer 47:53
Awesome. I just have a couple more questions so. Anything else I should know abou? I know you mentioned the Kendall foundation over here that they partake in but is there any other roles within the community that CIC is active in?

CIC *Interviewee* 48:13
Well, I mean we started CIC Health over the course of the pandemic so we're offering publicly available testing or COVID testing here at the corner of the building around on Third Street. So that leads to increased foot, foot traffic, and the fact that people are coming in to get the test taken. And we also had a hand in some of the vaccinations that were going on in the Hynes Convention Center. So CIC Health was managing that and at one point dispersing several 1000 vaccinations in a given day. So that was, that was a, like, governmental partnership that we, we ran both with local government, state governments, and the federal government as well, to make that happen. Other than that, there's like a few nonprofits that we've supported over the years. We support, what's it called, I mean well, venture cafe, is a nonprofit, it's like our sister association they're primarily focused on just building innovation community in these innovation hubs across the country. So that started here in this kitchen actually, and but now has sites as far away as like Sydney, Australia, and Code for Boston is another one that we support that's just like a local collection of coders that are trying to use their skill sets for socially minded causes what else I'm blanking on the name right now which I feel a little bad about but there is a youth oriented coding school that we gave pro bono space to for a while, as well, and they just like they brought in cohorts of locally, local custom youth and taught them how to code and kind of taught them that skill sets, they are a nonprofit and we just keep them, giving the space, free of cost. As a gesture of goodwill. Yeah, what else we've supported Extra Life which is a nonprofit that supports local children's hospitals as well as a yearly like video game centric gaming centric fundraising opportunity that happens every November, obviously with the pandemic going on it's harder to host that type of events we haven't supported them in the last few years. We're hoping to re-engage with that relationship when it's more safe to do so. Beyond that, that's all the ones that are coming to mind, off the top of my head.

Interviewer 50:52
Great. Could you just expand like most of those, like, do they need some sort of transportation there? Some sort of commuting back and forth between those locations in here?

CIC *Interviewee* 51:04
Yeah, so like for each of those, like the code for Boston folks like the youth coding camp, like the, the members of the public that have come for that extra life event. They all need to get here somehow. So, many of them are taking public transit. Some of them are walking. But I think I think those two modes are like, probably the prime, it's public transit maybe some riders and sharing, but just, just generally I think transits the way to go.

Interviewer 51:37
Okay. I just have two more questions. If there was to be some sort of emissions controlled or environmentally friendly, and, you know, autonomous vehicle right and say they were in contention for space for driving right. What do you think people's needs would be regarding taking over the bike lane versus taking over the street lanes

or how do you see that fitting in? Is that something that could be used to replace the bike lanes, would people still bike, or not if that was an option?

CIC *Interviewee* 52:24
I think people would still bike. We're if like a fleet of autonomous vehicles were available. I think if you removed, bike lanes I think fewer people would bike because it would feel less safe to do so. And vice versa if you added more protected bike lanes, more people are going to bike. But if you had, again if you have the infrastructure to support and autonomously, people use it. The question being, if you're taking resources to park those cars, those autonomous cars, and places that people would want to park their private cars, you might run into problems because people might feel upset about that. You get some of these people that are driving in or driving in from quite far. And I would just imagine that the autonomous fleet would actually reach them in their, their home out in Woburn or wherever it is that they're coming from.

Interviewer 53:15
Right. Okay. And then the last question that I have. Is there anything else that I didn't ask that might be important for me to know about CIC or its involvement in the community or any issues or feedback that you've had from clientele about commuting to this location?

CIC *Interviewee* 53:36
That's a good question. Yeah, I mean CIC as a company tries to remain pretty agnostic about what forming innovation takes so which form of technology, it's like we're not here to arbitrate or be arbiters of like which is most successful or most valuable. We let our users determine which is going to be the way to go, or not, we're not here to make a judgment call on that. I do know that many of our staff bike, many of our staff use public transit, some of our staff drive in. So we're also users of all of these different modes of transportation that I've mentioned. And I think also just. We've also supported companies that are working on the tough project of creating autonomous technology autonomous vehicles. We supported them when they also have a neighbor that's working on the same thing so it's, it's something that we're very open to in terms of supporting our businesses supporting that innovation are curious about it ourselves. And we're used to.

Interviewer 54:43
Awesome. That just actually led me into another question, but do you know how many staff are here at either this CIC location or the one that's on the street? Are they here, you know, Monday through Friday?

CIC *Interviewee* 55:01
Yeah so depends on what role we have or if it's a more client facing and direct service oriented role all of us are inside, five days a week. and right now between the three locations in Boston, Cambridge here, there are 16 of us that are on site every day. But beyond that, many of our internal teams and departments are still working from home, especially with the ongoing struggle with the Delta variant of the COVID pandemic.

Interviewer 55:34
Awesome. I think we covered everything we need. I appreciate you meeting with us.

CIC background info

CIC builds and operates innovation communities develops critical networks for entrepreneurs to grow. Also has cofounded 5 organizations: Venture Café to connect innovators, CI Heald for testing solutions, District Hall, and Captains of Innovation a consultancy and Innovation Hubs. CIC has presence in different locations Boston, Cambridge, Miami, Philadelphia, Providence, Rotterdam, St Louis, Tokyo and Warsaw.

What CIC offers:

Flexible offices
Coworking spaces
Community Kitchens
Conference rooms
Internet Services
Printing, copying, phones, furniture.
Technical support,
Concierge services
Host events

Founded in 1999 in Cambridge, MA, by MIT graduates at Kendall Square. “Since then CIC has attracted thousands of startups, corporations, investors, accelerators, and nonprofits to Kendall Square, helping to transform the Cambridge, MA, neighborhood into an internationally renowned innovation district.”[1]

CIC impact

More than 700 client companies
250,00 SF workspace
More than 100 monthly events

Works Cited

1. CIC Cambridge | Kendall Square Coworking and Office Space | Powerful Innovation Communities — CIC

Other helpful sites

- https://www.cambridgema.gov/Departments/TrafficParkingAndTransportation

MIT Open Spaces

Stakeholder is from the MIT Open Space Programming Office, a mom of a 1 year old, and commutes from the Jamaica Plain neighborhood in Boston.

Interviewee: So let's just start. You live in Boston, right? Do you commute to school every single day?
Stakeholder: Yeah, I live in the Jamaica Plain neighborhood of Boston. Before the pandemic, I used to do a combination of riding my bike to work, and I also took the T (Subway).
Interviewee: Was it mutually exclusive for you? or was it a combination of both?
Stakeholder: It would depend on the weather, and what I had going on that day. I love biking. I love the exercise and the fact that it is fast and reliable. I always knew exactly how long it would take me to get to work, but it did not feel very safe—so dangerous, which I didn't love.
Interviewee: That's true. That's true.
Stakeholder: But I did love how sustainable it is. It felt good, and I loved being physically active. But that was before I had a baby.
Interviewee: Well, congratulations!
Stakeholder: Yes, I had a baby in July of 2020. That was a challenging time, but the baby is wonderful. I started working back on campus in March of 2021.
Interviewee: Oh, yeah, that's when the whole country reopened!
Stakeholder: Exactly. That's when I started driving as I was bringing the baby along. My baby is in daycare here at MIT.
Interviewee: Okay.
Stakeholder: It is so sad to be driving because I don't feel like it's very sustainable and raises the cost. It's like driving in Boston. Traffic isn't super great, but I have to because I have a baby now. I guess I don't have to, I could take the T but because of COVID I don't feel that comfortable taking the T with my baby; he's so young, he doesn't wear a mask.
Interviewee: Yeah, he can't hold the mask in place.
Stakeholder: Exactly. So that's probably more info than you ever wanted. But that's my whole transportation situation.
Interviewee: So the next question is, what does your typical day look like regarding your commute?
Stakeholder: I'm driving and I park in the Hayward garage.
Interviewee: Then how much do you interact with the transportation system on a daily basis?
Stakeholder: Like public transportation?
Interviewee: Just any transportation system.
Stakeholder: Whether public or private, it's just driving to and from work. And then when I'm meeting with colleagues, a lot of it is connected to the T, so they're often arriving at the T.
Interviewee: Does that work well with your current commute?
Stakeholder: I think so. I wish my commute was a little more sustainable. But since I have a baby, I need to drive.
Interviewee: What new features and services would you like to see regarding the current transportation system here?

Stakeholder: Well, one thing that I would say that I love is that MIT has the free T pass for employees. That's just wonderful. I really appreciate that. I would encourage your group to advocate for keeping that. It has certainly encouraged me to take the T.
Interviewee: What would you change about your current transportation experience?
Stakeholder: Honestly for me, it's all tied to my personal life, to my family, to my child getting to daycare. That's my whole perspective as an MIT employee with a baby thinking about my role as director of open space programming. I've been involved with a new initiative that MIT is taking on around pedestrian wayfinding. This is through the Office of Campus Planning. They're at least going to be these pedestrian ways, which I think will be massive for MIT visitors, since buildings can be very, very hard to find. I'm excited about that. And I think it'll be a huge improvement to the experience.
Interviewee: How would you prioritize that new feature? Super important or kind of important?
Stakeholder: Super important. Certainly for my work as well. One of the pain points for Cambridge residents coming to MIT is not being able to find the location of an event. And then coming into campus and getting lost. Yes! A bad experience.
Interviewee: What would you not want to change? What do you like about the current transportation system? I know you touched on that subsidy. Anything else?
Stakeholder: I like the quirky architecture mix of MIT, buildings with open spaces for example. I like the eclectic nature of MIT.
Interviewee: Can you describe a personal experience you've had with the transportation system, good or bad?
Stakeholder: You know, I'm a big fan of public transportation and I used to take the T from where I live in Jamaica Plain to campus. I would take the orange line to the red line, and the red line goes over the river. It's so beautiful. I loved that moment of beauty in my daily commute.
Interviewee: On a scale of 1 to 10, how happy are you with the current system?
Stakeholder: Well, personally, I would say five, because I feel guilty about driving. I feel it is bad for the environment and not good for my family situation. My child doesn't love being in the car while I'm driving.
Interviewee: What changes do you expect to see in the near future in regard to the current configuration? I know you talked about the pedestrian way-finding. Any other changes on the horizon?
Stakeholder: We are all obviously thinking about climate change and what's going to happen with sea levels rising, what's going to happen in Cambridge and how that's going to affect all of our day-to-day lives. And then, think about how I do my planning today: How's traffic? I checked Google Maps on my phone before I left to see which route I should take. I also keep an eye on the Red Sox schedule because I go by Fenway.
Interviewee: So in the context of a new transportation system, what are the potential impacts for MIT open space planning?
Stakeholder: It's really thinking about how we're communicating with participants in our programs. It's really just encouraging people to take public transportation, to bike or walk, and enthusiastically encouraging people to adopt these methods. Driving and parking can be so distracting. It's such a pain point for people who drive.

Interviewee: How should utility play into a future transportation design? So for example, how should the systems address most day-to-day needs of on-campus students, such as grocery shopping?
Stakeholder: So it's kind of a design criteria going into the next phase?
Interviewee: Yeah, Phase 2, but for you, as a ***Stakeholder***, how important would you say utility is?
Stakeholder: Well, if you're carrying your groceries, maybe walking is not practical when you compare it to riding a bike.
Interviewee: Are these critical in terms of utility? For example, being close to shopping centers? That kind of stuff?
Stakeholder: Yeah. I think I would probably go to the location where the biggest housing is. Compare where you live with to where you're working. I would tie it to proximity. Can people afford to live near MIT? The answer is probably no. And that's the challenge.
Interviewee: That's true. How should sustainability be implemented? Phase 2? Or should the goal be zero emissions from the start?
Stakeholder: Yes, from the start since it won't help if you have to ride a bus running off of gasoline.
Interviewee: How important is sustainability?
Stakeholder: Very, very important. Extremely important. The office of sustainability is doing a lot of great work around this. You may have already seen that in your research. They just did a great presentation that I went to yesterday. They talked about some of the climate and sustainability goals that MIT is moving towards. So definitely worth checking that out in their website.
Interviewee: Do you think autonomous options should be implemented?
Stakeholder: Sure. Absolutely. MIT is well positioned to think about that balancing of safety concerns with technology. I've seen some research that indicates that there are a ton of safe options, so I am good with autonomous. It's like safety first, but always thinking about your economy, right? There's a group out there that would not want autonomous vehicles. They probably won't get into it. I'm definitely open to it because I think there are a lot of very, very, very distracted drivers out there.
Interviewee: Yeah, I agree with you here. So then how should the system align with Strategic orientation?
Stakeholder: Right now I know a big Focus for MIT is having Kendall square become kind of the public entrance.
Interviewee: How important is it to be tied in with that?
Stakeholder: I certainly embraced the idea of Kendall as a new gateway to MIT and that all sort of ties to a stop being right here.
Interviewee: That's true. So for those four criteria that we went over: utility, sustainability, autonomous, and strategic orientation, how would you rank them in priority from 1 to 10?
Stakeholder: Sustainability would be a 9, at the top. Strategic orientation is also very high on my list. Then utility and then autonomous.
Interviewee: Then what other considerations or needs do you feel are important for moving into the design phase of the transportation system?

Stakeholder: I think it should be beautiful, aesthetics. It should also help with people's well-being. Transportation plays such a role in people's day-to-day lives. There should be ways that it helps make people's lives better. That could be through public art or music. It could be through healthy views. Having some creative partners In the mix is always a good idea. You need the right mix of people to help design it. You want to think about people's whole experience. This is in our minds these days because of COVID, because of the isolation that many of us experienced during the lockdowns. So thinking about the social experience, how are people coming together and having conversations in a safe way, would include moments of beauty and well-being. Looking at the design of this space, you can tell time, effort, and thoughtfulness was included. We need to look at how many trees we are able to have in this space and how healthy that is. This is really important from a sustainability perspective as well. All this ties to your productivity and the the kind of work you're able to do.
Interviewee: You talked about the social aspect of the transportation system regarding COVID. I want to dig deeper into that. How do you foresee plating design? Do we need to have social spacing implemented?
Stakeholder: I guess I would advocate for open outdoor spaces. I think we all realized how valuable outdoor spaces are. Especially during covid where you could sit outside and feel comfortable. We are not wearing masks right now, and we feel safe and comfortable, and I think that's really important. You could build parks and green spaces. I think that would be wonderful! Take inspiration from this space, which used to be a big parking lot. A big, ugly parking lot and now it's an outdoor space with trees, furniture and a place where people can gather.
Interviewee: What other transportation modes would you want to see? Aesthetics are important to you, so would you be for a rail above ground or bus system? Because that can start interacting with how students walk across campus.
Stakeholder: As a new mom, I guess I'm open to a variety of different modes of transportation. I am now very aware of transportation requirements when having a small child. So, there are lots of graduate students with kids, and faculty and staff who have families. So that's just sort of hope in my eyes too. Once you have kids, it gets a lot more complicated!
Interviewee: So how important is it to consider family friendly transportation?
Stakeholder: I think you need to add it into the next system. A lot of people are just thinking about themselves for their transportation needs. That's one factor. There are those who have disabilities, so you'll want to think about that. They're going to be people who have kiddos. You'll have to think about that. You want to make sure you get lots of good perspectives in the mix, and it's not just one type of person with one type of personal life situation.
One thing we haven't mentioned yet is hybrid work, and that's huge. I could work remotely because of the nature of my work and my childcare situation. I would not have the need to drive, but I have to be here. My child care is here, whereas my husband's work is still fully remote at home, five days a week, which is interesting. I think that's a huge component of this, especially for MIT staff. There are a lot of them, IT staff, who can be remote a good chunk of the time. It'll be really interesting to see how that plays out over the next couple of years. That's an interesting one that will apply to students too. Think about students' schedules and how much they could be remote. Certainly reduces the demand on the system. Already a market sizing question. Do you have any more questions?

Interviewee: No more. No more questions. Do you want to add additional things to the conversation that you think are important and should be discussed for the design or any other needs as a ***Stakeholder***?
Stakeholder: Nope. I'm just glad you've got my working mom perspective in the mix. That's good. And then also the green outdoor spaces and how much that adds to everybody's lives. That can be worked into a plan.
Interviewee: I think we're good. Thank you for your time.
Stakeholder: Well, I am happy to do it, and it's a nice day out here.

MIT Admissions

[*Interviewee* has been primed on context of future transportation at MIT / Kendall]

Interviewer – Alright, let's start off with some softballs! Tell me a little about yourself, your background, and how you got into this role.

Admissions Office [AO] – I'm the Assistant Director for Campus Visits in the Admissions Office. I started off as an administrator in the Visitor Office five years ago, and now manage Campus Visit programming for undergraduate visits. I manage and oversee all the different programming, including information sessions, campus tours, group visits, and the 'shadow a student' program. Relevant to you, I am also involved in 'Campus Preview,' where admitted undergraduates visit campus before the semester begins.

Interviewer – Excellent. I'm definitely going to want to hear more about those programs! Before we get there, I want to give you a sense of how I've segmented the interview. I'm going to ask a few questions about 'A Day In The Life' of a campus visitor, then ask some questions about that relate to the Admissions / Visitor Office Specifically. Then, I'm going to frame some questions around the 'Existing' transportation and the 'Future' transportation system. Let's start with a day in the life. What does 'A Day in the Life' look like for your campus visitors?

AO – Well, we encourage all of our visitors to use the Public Transportation, specifically the Red Line, especially since our new office sits right outside the MBTA entrance. But you would be surprised how many people show up in personal vehicles. This is mainly due to two reasons: First, students usually visit with their parents – who either drive in or are more likely to rent a car. Second, students are often visiting multiple universities when they come to Boston. I think there are 70 universities in the greater Boston area! If they are going to visit campuses outside of the city center, or have a tight schedule – a personal vehicle is usually preferable to trying to take public transportation. After they arrive, we host a 30-minute information session followed by a 60-minute walking campus tour. We do not use any of the blue bikes or MIT shuttles during walking tours. Often, visitors leave shortly thereafter.

So, despite our encouragement to use the Red Line, and our new offices being right at the entrance, there is still a strong preference for visitors to drive. Because of this – parking is always an issue.

Interviewer – Now I want to move to the Admissions Office in particular. Can you tell me how transportation was considered in the development of your new Welcome Center?

AO – I've only been here for 5 years, but I think the planning of it has been going on for at least 10 years. Yes – Transportation was definitely considered. As far as I can tell, it was a primary motivator in moving our Office – which used to be in Building 10-100 (Infinite Corridor) – to a place that was easier to *arrive at* and *easier to find*. People always had difficulty entering in to

Building 7 and finding our offices in the middle of a huge complex of buildings. This new welcome center is on a major street, just outside the MBTA stop, and thus much easier to find.

Interviewer – Is transportation a topic used in any of the visitor programming? For example, is it used an attractive feature (e.g. MIT has good public transportation and a car is not necessary)?

AO – It is not specifically mentioned in the Information Session, and I cannot say if it is brought up by the students who lead campus tours. Visitors definitely experience walking around campus if they Shadow a Student – but I couldn't say if they interact in any other way with MIT / Kendall transportation system.

During Campus Preview Weekend, we expect about 1000 (of the 1300 admitted) undergraduate students to descend onto campus. More and more, we see parents join their kids for this weekend, too. Similarly to campus visits, parking is again an issue. We have before tried to arrange shuttles to bring students and their families from the airport to campus – but we have stopped doing that.

Because admitted students stay the entire weekend and there is programming (not just by Admissions) all around campus, there is a lot of competing needs for different folks who are unfamiliar with MIT / Kendall. We encourage the use of the MIT Shuttles, but often people end up walking everywhere.

Interviewer – Thank You. Now I want to talk about the existing transportation system and open with a generic question. On a scale of one to 10, how happy are you [as a Admissions / Visitor Office Administrator] with transportation around MIT / Kendall? And Why? Similarly, can you ask try and answer that same question from the perspective of your visitors?

AO – For me and the visitors, I would rate it a 5. I come back to parking again. The first question a lot people ask when they get to our building is still, 'My dad's trying to park. Can you tell me where a lot is? I understand and personally would desire that people drive less, but from their [Visitor] perspective – they really want and expect convenience.

Interviewer – We've talked a lot about driving, and a little bit about the public transportation. What about sidewalks, navigability, bike availability, bike lanes? Did these items factor into your score?

AO – I think of MIT as being a very walkabout, block centric campus. A lot of students get to and from class for the most part, just by walking. This may be anecdotal. But yeah – maybe I'll give it a 6 instead!

Cambridge has done a lot with bike lanes over the past couple of years, but those could always be better.

Interviewer – What problems do you think exist with the existing transportation system?

AO – As you pointed out, we do have lots of options to get around – bikes, sidewalks, train, bus, etc. The problem, I think, is that some of are not valid options due to weather – especially in the winter. Slushy sidewalks and snow closures have definitely impaired campus visits and walking tours before. There have also been issues with accessibility. Every building on campus is accessible, but not every door [cites a couple specific examples].

Interviewer – Can you share any memorable experience or anecdote – either positive or negative – that you or one of your visitors had that involved the transportation system?

AO – [Not really. Cites the Red Line derailing last week.]

Interviewer – Being mindful of time, I want to talk about the future. You already mentioned a few things that could be improved – bike lanes, MBTA reliability – so I'll skip the question about what you think you can improve. I want to ask a fuzzy question. What do you value from a transportation system? Think BIG. Don't say 'more parking!'

AO – [Laughs]. Efficiency – both in the energy usage sense and the 'on time' sense. [I will dub these 'sustainability' and 'reliability']. Additionally, I also value Safety. The Red Line derailing is fresh on my mind. Finally, Convenience. I think if it were more convenient to take other modes of transportation, less people would choose to drive a car to campus.

Interviewer – Alright. Last question. If you could add a new feature or service to the transportation system, what would it be? What would it look like?

AO – In short – turn the MBTA from a 'spoke' configuration to a 'hub and spoke' configuration. This way, people wouldn't have to travel from the outside to the inside and back to the outside.

MIT Campus Planning

Interviewee: A Senior Campus Planner from the MIT Office of Campus Planning ● Permit to record?: **YES**

Summary of Questions and Responses

- **What does your typical day look like?**

○ Pre-COVID - used to be a commuter bus and rail user into Kendall Square.
○ Post-COVID - drives into work about once a week and parks next to NW -23.

- **How well does driving meet your needs?**

○ Takes about half as long to drive to campus than to use public transit (~30 minutes versus ~1 hour 10 mins).
○ Driving is more convenient i.e. no connections to think about.
○ Driving offers more reliability and flexibility of schedule of getting to and from campus.

- **On a scale of 1 to 10, how would you rate driving in the Cambridge, MIT, Kendall Square area?**

(1 being terrible, 10 being amazing, 5 being meh). Why did you give that score?
○ 7 out of 10 … maybe an 8 out of 10.
○ Post-COVID - comes in very infrequently (only on Tuesdays) and he questions the rationale of coming into the office only to attend Zoom meetings all day.
○ Driving then is the most convenient way to come to the office and since traffic at peak hours has smoothed out, it is much easier to drive now than before COVID.

- **Do you have documents for the data on commuting patterns?**

○ MBTA Fiscal Management Control Board - https://www.mbta.com/leadership/fmcb.
○ A Better City (ABC) Boston - https://www.abettercity.org/publications.

- **Do you have experience with other transportation systems (e.g. in other cities)?**

○ Yes. Went to school in Western Massachusetts. Spent some time in bigger transit cities like Chicago, New York and Los Angeles.

- **If you could add a new feature or service to the MIT/Kendall Square system what would it be?**

○ Really enjoyed the shuttle service used to get around in Western Massachusetts. The reliability of the shuttle is his best memory of the service.
○ Really enjoyed driving around LA on vacation.

Transcript:

Interviewer: Yes, exactly. So it'll help to have to have the full transcript so I can like take notes after ... these transcripts are better than I thought they would be.
Interviewee: Yeah, and I've seen them before so it's actually not a bad platform in that sense.
Interviewer: Yeah, absolutely. Yeah, thank you. So to kick things off please tell me a little bit about yourself, your background and how you got to your current role as a planner at at MIT.
Interviewee: Uh, well I'm, you know I'm old, so this could be a long story but the short version is I, I, I went to MIT, to be a for a
master in city planning in the 80s, and then I worked for state and local government I worked for community based organizations. I was a real estate development consultant, most, most of my focus was more kind of Housing, Community Development not transportation. And, but when I came when I, I came to MIT in 2000 as MIT was really accelerating its capital building program. And one of the projects at that time was to rebuild Vassar street from Main Street to the close to the end of campus, and on the west side. And there was also interest in doing a kind of a. I guess I call it, I call it a, a comprehensive transportation plan so we that included, looking at things like parking and community commuting activity and, as well as some on on transit and and alternative modes of travel, really focused on the kind of the community here. And the other thing that was happening at that time was a proposal for a thing that nobody that nobody talks about anymore, yellow, it's kind of being constructed in pieces, it was called the urban ring. And the idea was that we have a hub and spoke system in the metro area. But the connections outside of the downtown region were sometimes very difficult like to get from Brookline, or the Longwood medical area to Cambridge, MIT, Harvard was not easy. Yeah, you kind of relied on poor bus service. Yeah, even though, you know as the crow flies. Yeah, it was quite close. Yeah. And there was also kind of an equity piece of it where you the feeling was places like Dorchester and Roxbury. We're close to some of the job centers, but, but we're not really well connected. And so, could there be a. And there were two different ideas about it you know all that we should be a hard rail system. Yeah, kind of circuit circuit now and and then there's kind of a whole North Side thing like it would go from through, Cambridge Somerville Everett, Chelsea. The Logan Airport, and the interesting part is the city in the pardon me the MTA, you know in their wisdom, has begun to put piece together a that link, particularly on the north side they, starting with the Silver Line, which, you know has has its own issues in in Boston, but coming out of South Station to to Logan and now into Chelsea, and the idea now there's a new, they're currently planning for a Chelsea Everett, Somerville Cambridge connection for bus rapid transit. Using trying to use a good deal of the right of way that that is just already in place.
Interviewer: I see, is this the cable cars?
Interviewee: No it isn't. It isn't so much a using catenary lines, it would be, although it could be. It's probably more of a high, you know like the Silver Line. A hybrid. If you're in tunnel. you want to be able, you want to stop running your engine, you want to run on the catenary, but when you get out on the road way. You know they run, they run on diesel not you know

obviously diesel buses are are perhaps not long for this world so yeah you know in battery technology has changed a lot catenary lines are work but it's expensive and complicated. So exactly the technology, you know that that's going to emerge from that I'm not certain. And maybe catenary lines I mean, it may be a piece of it, particularly if they're running in a lot of separated right away like that so you know on the street, it, it's tougher on the street right to to get that to work tougher to interact with mixed traffic.

Interviewer: Okay, got it.

Interviewee: Well anyway, you know, that was a beta you know there's so that was a big idea, and it was obviously was going to affect MIT because that was a big idea, and it was obviously was going to affect MIT because they were going to come right to the middle of MIT with that. And so that kind of got me more fully engaged with kind of transportation as a, as a field I mean it kind of became [*Interviewee*]out of up, you know, on the job training, it wasn't like I, When I was at MIT. Yeah, I, I didn't really, I wasn't really on the transportation track I mean I knew people who took classes and in civil engineering with a variety of luminaries there and you know that, but that wasn't me at the time and I kind of wish I maybe I should have I kind of tried to, as they say, learned on the job.

Interviewer: Yeah, later. Yeah, yeah, learning on the job is many cases better than actually well

Interviewee: Right now there's definitely some advantages there I think the other thing that we, you know, kind of the stuff I picked up from these big kind of mega projects. I also my main job really over the last, you know, over the last 20 years has been helping new projects at MIT, get all their planning permissions to build, right, and building graphic, they showed yet well I mean it's more like built, you know, every building on new building on campus in the last 20 years. So, when you, when you permit them. One of the biggest issues is always Oh, what is the trance, you know traffic impact and they really mean, you know, automobile impact what's it going to do to to our to our traffic situation. And so, you know, I learned a lot from the consultants who, who kind of specialized and doing these kind of traffic impact analysis and rice Yeah, okay, so you know I sort of picked picked it up, picked it up along the way you know.

Interviewer: Okay, great.Awesome. So then this means you have the right context for the questions I'm about to ask.

Interviewee: Okay. This is scary.

Interviewer: You see the whole you see the whole system and you're embedded in it which is great so yeah please tell me what does your typical day look like from a transportation standpoint.

Interviewee: How do you mean like, how do I literally how do I get around? Or how do I plan for transportation daily?

Interviewer: How often do you engage with, with the transportation system.

Interviewee: Well, I'm, I have to say I have. I used to be kind of a commmuter or commuter bus or rail rider into South Station, and then back out on the red line, you know since we've moved I used to work in any 49 like in tech square. God and pretty much since we've moved to where I'm sitting right now which is NW 23 Albany, st Alban corner of Albany and

Pacific, and we have there's a parking lot there but our buildings right next to it. Just close to NW 35 to the, to the dormitory there into the corner from the warehouse and plasma fusion and the big magnet is right there anyway. I've really become more of a single occupancy vehicle driver which is you know sort of the scourge of the transportation planner right I become my own worst enemy. And, frankly, you know, the idea that there's parking like right next door. Yeah, it is kind of an incentive it's like, Oh, that is so easy. And I, you know, it would take me taking the train or bus and getting all the way here and including block from from Central or, or, Kendall. The definitely over an hour, you know an hour and 10 minutes, not crazy time, but, you know, I, but I only live in Newton, right, so I'm 10 miles and miles out of town, and it takes an hour plus Yeah, right.

[*Interviewee*]And I can drive in 530 minutes, I can come and go exactly at the moment that I need to. And so, I become kind of spoiled by that so and you know parking, you know, it's sort of funny because I'm on the Parking and Transportation Committee which is like an advisory group to the administration. And one of the big things that are were charged with is advising them on parking rates, right. How much should parking costs, and I'm always stunned that people think paying you know 910 $11 a day is like an obscene amount of money when it would cost you probably 40 to $50 a day to park commercially if you drove to this area it's like, got it. Yeah, well once you're at MIT, especially old older faculty and staff they sort of remember the campus has kind of this suburban place like the idea that it's really in the center of the city is kind of lost on them, or in right now. And they, you know, they didn't use to charge for parking, I mean I had people who were like, Well, you know, they didn't even charge for parking when I got here I'm like, Well, yeah, but, you know, world's change. Anyway, okay so I'm delighted to pay my, you know, $11 and drive. And, you know, getting around on campus. I mean I take the shuttle every once in a while. Yeah, but very compared to the number one we were right next to the dormitory and I'm always amazed how many students will like stand there and wait for the shuttle instead of, you know, yeah just walking I mean it's just not that far I mean if it's raining or so horrible out I get it but yeah I'm always surprised by that that I see. So, you know, I find it pretty, pretty easy getting around on campus. Yeah.

Interviewer: Okay, great. And that actually answers some of my next question maybe we can dig a bit deeper into. How does driving meet your needs. I kind of got a sense for what I care about you mentioned, it's about half as long to travel between, you know, your home and and campus, and you're parked right next to where you work, so there's no walking or other logistics to think about and right. We also mentioned your schedule flexibility you drive up when you need to drive in when you need to.

Interviewee: And the end you kind of goes with that the kind of sheer reliability of it right as like, I never worry that the red lines broken down or, you know, my bus, I miss my bus connection so it's another 15 or 20 minutes to get the next bus. So it's kind of a, you know, the expense of it is is kind of is offset by kind of the convenience and reliability of it that's that's probably. Yeah, and, and the time savings that's not nothing but yeah I'd say the sheer convenience, I can just kind of be working and doing something and then say, Oh, yeah, I should probably get going and I can just like book. You know I don't have to think about, oh so it's tonight is going to be like an hour and 10 minutes. Yeah, you know, and I have to make sure, like the fennel hit the red line at the right time, used to be. I mean, you probably maybe you remember these days that like trying to take the red line into town at, you know, five o'clock, it

was brutal down there I mean it was a madhouse even getting in was, yeah, yeah. And, you know, it's. times have changed in that respect for the moment so.
Interviewer: Absolutely. All right. So then, on a scale of one to 10 How would you rate driving in the Cambridge, MIT Kendall Square area? With 1 being terrible and 10 being amazing?
Interviewee: Yeah, yeah. Honestly I have, that means particularly these days, I'd have to give it a ... maybe a seven. I mean it's okay maybe even an eight i mean it's it's been easy.
Interviewer: And by these times do you mean post pandemic or just in general?
Interviewee: Well, yeah i mean i i you know i mean maybe this is part of the story. I mean, I was basically never on campus. For a while, well over a year. I mean almost not it never came to campus, yeah and and then kind of over the summer, once in a while I mean it was, you know, I would say like coming into take a coven test or something or, I mean there was no in house meetings, was no, you know, collective [*Interviewee*]work done in the office. You know, we did a kind of a back to work thing in September, which had a lot of flexibility and it kind of collapsed almost immediately because of delta variant and other things and even today I mean it was kind of a nutty I mean, yeah, I can't I can't Why come in on Tuesdays right it kind of got stripped back to that I come in on Tuesdays and I most the other people in my group only come in one or maybe two days a week, and got it. And we have a staff meeting on Tuesday, but not everybody even makes it into that so we're doing it hybrid right i mean there's six of us who got in and then four of us or three of us or whatever, who are who are on the screen, and I have been in back to back meetings like this for since 8am this morning.
Interviewer: Wow.
Interviewee: Yeah, and it's kind of nutty it's like, you know, if I was sitting at my desk. Yeah, it's required that I wear a mask. I'd have to have a mask on like this and you know so i commandeered this conference room here. And, yeah, you know, at least I don't wear the mask and I can, you know, grab a bite to eat or whatever but it's. Yeah, yeah, it's kind of silly it's like, why am I doing this and I think there's, I mean what I've heard is. Yeah, the experience of the kind of student facing staff and faculty is 180 degrees or my, my experience, and I you know I work with some faculty, and some, you know, like housing staff and other people but, yeah, it's overwhelmingly on a remote basis and got it, it's just a very different feeling I mean it's, I don't know, I don't know what's going to happen I'm really hoping that's going to change. This seems ridiculous what I'm doing.
Interviewer: Yeah, so that is it the coming in, just tell me a bit more ... Is it the coming in or the experience of being here?
Interviewee: The experience of being here. I don't, I mean, as I mentioned, I mean, my commute so to speak is not that difficult. I mean I don't you know is the biggest problems I kind of forget, like, Oh, geez I gotta be in tomorrow. And I have an 8am meeting. Yeah, so I gotta leave the house, you know, instead of like rolling over to my, you know, kitchen table. I have to, you know, roll over to MIT and that's kind of take a little bit, you know, that's no big deal I don't, that's not the worst but it's really being here, nobody else's here. Like when I could be home, you know, eat lunch at home, you know, hang out with my dog at home, do whatever I need to do, and get my work done. Yeah, so i don't know i mean i'm, i'm like complaining like you know disgruntled employee but i know i, it makes sense because I guess that's, that would

be the purpose of doing an interview before redesigning a transportation system it's really capturing all the needs of the people say, and when we're in such an uncertain time I mean I just we just had our Parking and
Transportation Committee meeting and, yeah, we, you know, everyone is still kind of struggling with, you know, gee, what what's going to happen next and, like for example we were really terrified. Yeah, like when during coven, the administration decided to make parking free. And people were terrified of taking the teeth for, go ahead and other reasons, and the tea. Cut service. Right, it began service for game, you know even more unreliable and and in frequent and a ton of people, like we had, I want to say, 5000 people that just measured by like who has a parking account right there was like pre covid like 5000. When parking was free and during coven huh 2500 more people got parking accounts. We only have 3900 parking spaces on campus. And so it's about almost, almost two to one like all you're not quite not quite to the width and points. Yeah, that yeah yeah okay there you go yeah you're an undergrad I should, but about there. That, you know, because of the diversity. You know, put a lot of people aren't coming in all the time right at that time, but the worry was well gee when everybody comes back. And they've discovered the joys of parking and driving and parking. Will we have enough space, you know, will we be able to accommodate all these people, or will the kind of flex work part time thing offset that bad increased demand and. So, what we did. We meaning sort of MIT writ large is we expanded the subsidies for transit for, for, we increase the commuter rail transit, we increased reimbursement for parking for transit, and a couple other things. [*Interviewee*]And we also reinstituted parking charging. God. So wasn't free and I gotta say that day it stopped being free. Yeah, the parking lot was no longer full. It was like, that was the weird part I was coming in with a few times I was coming in, when parking was still free and I was thinking, Man, I can never get in that parking lot of have it go to have a further one away. I say, and I was so stupid I was like, you know the guy who manages parking finally said to me, Well, Cal, it was free. Those people put come drive the car and park is free. I'm like, Oh yeah that's right because it to me I was sort of indifferent to the clock charge, it's like okay it's free great, but you know I'll pay if it's if I gotta pay. Yeah and anyway what we found was no between charging for parking and the kind of delta deferral in return to campus for so such a broad number of people is separate from faculty and other student facing staff. It's still it's kind of sheer administrative, you know bloat that I
represent is maybe four or 5000 people I mean it's a lot. Yeah, that basically because we were not coming back that much. We're still fine you know it, it's all our, our parking is running it about. I want to say about 70% occupancy or lower. Even though the tramp. You know the transit. Use is maybe 20 to 25% of what it was pre Go ahead. Go ahead. Okay, yeah. What we don't have and this is came up today was kind of like, well, but what's the denominator there I mean, yeah, if people aren't coming at all to campus, and you can't really compare how many people took transit now. vs. vs before versus then as a, as you know it's a critical piece of information but we're gonna we're going to get that and I gotta grab that information so.
Interviewer: Okay. Got it. So you mentioned earlier that you would rate, driving a seven. Because that's your primary mode of transportation. So I want to ask two questions. What problems do you have with with any of the other modes of transportation? What other word problems do you have with public transit as it is, you've kind of mentioned it before but I want to turn in a bit deeper there?

Interviewee: Honestly, I it. It's almost like a weird psychological thing almost for me. I mean, I haven't taken. I haven't taken the commuter line or been on transit. Except me, like, really since March of, 2019 2020, pardon me. Yeah, yeah. Sorry, I was like what year. What year is this ya know that that's right. Yeah, okay. And it's not because, you know, I've been somebody who's been trying to make the case that, you know, the tea is safe, and you notice it's not like I'm really worried about that. Yeah, but I think it's kind of reinforced my desire for that kind of convenience and spontaneity. If you only go it like if you kind of do something every day you kind of get into a routine, like, you know, I, I'm in a good place I'm, I'm like, 1010 minute walk to the boss or the commuter rail from my house very convenient. But if I'm not doing it, not coming in regularly and I'm suddenly just kind of like waking up on Tuesday morning and saying, Oh geez Today's my day in the office. Yeah, I better get better. Yeah, it's just the sheer freedom and spontaneity of it, and and convenience. Yeah, is somehow it's reinforced I don't know it's kind of a weird psychological thing. So it isn't so much that I think I'm afraid of it for health reasons or I think it stinks or something you know the service so terrible. Yeah, and possibly and so forth. I mean, I think have largely restored the service they now have a kind of a on the hour. I'd say, at least on commuter rail I'm not sure about the bus. But, and they're running more service during the day I
mean one of the things right is sort of response to one of my complaints. Yeah, which is. Oh, if, if I'm going to leave you know at some odd time like outside of peak hours. Usually after but sometimes before, is it, it was. There was very little service, right, because they were sort of set up in a kind of a 1950s suburban Dad, you know, going into his white collar job in downtown Boston, and he leaves, you know he gets on the train at nine and he leaves at five and, you know, life on it. I mean, in that way until two years ago, I mean, you know, that's just how it ran. Yeah, now. Yeah, the peak times have softened basically for both am and pm on the, the kind of shoulders in between them, have increased. I say and interested, the T has wisely responded to that by saying you know what we need more Mid Day service and in fact, there's a bigger, almost. Non, it's not just coded related but kind of a secular change in the idea that you know what we really shouldn't even call it like commuter rail anymore, that that's an outmoded notion. And in fact, we should think of it as a kind of a regional urban train system, and to service that, then it's really about not just getting somebody to work, but get them to their medical appointment or get them to school or to pick up their kids or to go shopping. That way you can have that right if, if, like there's no service for three hours you know you're just like us. Yeah, get downtown you do your shopping and then you're like oh I guess I gotta wait till 430 for the, you know, or, you know, two hours to get on the train at three or something that doesn't work for people so they drive right so the idea is, hey let's create more of a culture of transit us. Yeah, I providing more reliable and frequent service which is kind of the bottom line requirement of of travelers. Yeah, transportation system.

Interviewer: You mentioned something really interesting there is that there is a sense of you know traffic patterns changing dramatically. As a result of the situation we're in. Would you have any pointers to like good sources on this information I think we could really use that flower and and maybe maybe they're not like as current as like yesterday but like just any documentation.

Interviewee: a good place to find it. The, the MTA board met the actually the old fiscal control and management board or fiscal management and control board FM CB, they have now

disbanded and they have a new, a new board of directors. That just started but they used to meet every Monday, and that staff did some really great presentations on, you know, very it especially like what's happening with the ridership okay what are we saying. And so I would, I would go to the MTA you know boards website and try and find that you'll find some of those presentations should be. They were they've gotten really good about a generating more like having more data that's in a digestible. Yeah, warm, and making it available. So, you'll find it. Okay, maybe another another place to go, I would say, maybe is simpler than even that is a better city is a better city fit yeah it's called a better city, Boston, right i mean it, they're just ABC is what we call them. Oh, yeah, and they they've done some pretty good work. Okay, on kind of the back to work, story, and, you know, at NSF saying during the coven period what what's happened, and they've got a couple of really good reports they did a huge survey about active work stuff responding to some of these changes. So you'll find, especially that there's there's sort of a competent they've, and they've maybe picked up some of the find them.

Interviewer: Nice.

Interviewee: Yeah. Oh yeah, right here in the chat if you yeah let me find them better. Yeah, and then they have some of that survey stuff they're talking about, you know, how should we change. Like for example, one of the big issues that's emerged in the tease trying to deal with it has the monthly pass system I mean again that this [*Interviewee*]sort of goes to the old computer mentality like you get you make your choice like once, and you get your monthly pass. Yeah, and your end. And, you know, sadly, a lot of parking systems work the same way you, you would pay your monthly parking to your employer on a monthly basis. So either way you feel like it's a sunk cost right and so you have this, you know, human aversion to loss, right, that the sunk cost where oh well I already paid for my parking, so why would I take transit, right, and now people are are saying, why would I buy a transit pass for a month. Yeah, why not. I'm only going to go in five times this month. Yeah, so it's ridiculously expensive. Why would I do that, it'd be easier to pride, right, because I'll just pay, you know, if you can, if you can do that i mean if you have the parking on a daily basis you you might do that so. Okay. Yeah, so there's changes definitely changes afoot in the city and so the T is thinking about, Oh well, maybe we should have a five day pass or a 10 day pass that I think they're already starting to be about available. Oh shorter durations more in tune with more flexible right more flexible, you know they'd be good for. Yeah, maybe 90 days she gets her 10 to, you know, 1010 past but you could use use them, you know, eight on the 89th day you could still be using. Anyway, I you know there is some creative thinking that that's going on but it's tough, tough to turn these ships, you know. Yeah, the battleships like ride, just kind of slow.

Interviewer: Exactly. So okay, I know we're almost out of time here because I promised you 45 minutes max but I do have just one more question that I hope we can get through. It's like a multi part question.

Interviewee: Of course it is.

Interviewer: Yeah, so the question is, do you have any experience with transportation in other cities? And then the second part to that is, if you could take just one feature from those other experiences into this area, what would it be?

Interviewee: Yeah, I mean I've never, as I have lived as an adult in the Boston area. Yeah, you know, my, my whole adult life is what I'm trying to say, you know, I went to I went to

school in Western Massachusetts. And one thing that was really and I didn't have a car. At that time, they had this like shuttle bus system that ran between various college campuses there. Okay, and it was, it was great, you know I just I love that little shuttle bus it worked. I mean, it was like you know like the tech shuttle here. Yeah, it in the sense that it was, it was free. It came by pretty regularly, but it's a lot longer distance there to get between UMass Smith College Hampshire College Mount Holyoke Amherst College. And, yeah, but, uh, you know, it was super convenient. And you just hopped on and did you know and so like, I lived. I was, I was at UMass, and I moved with some friends to North Hampton, close to Smith College. Yeah, so it was super, super easy and it made life. You know I did I will say I might couple of my roommates did have cars so you could do things like go grocery shopping or whatever but I mean this is in the olden days right before Zipcar before Uber, but, you know, before ways that you can substitute for having a car right now in a way that maybe wasn't so easy then but but I really without that, without that shuttle bus I mean, I, I wouldn't have been able to to live there and I've assumed it was a great place to live and made Yeah, I hardly even remember like, like, I don't remember sort of this image of myself sort of huddle by the bus stop or something or, I see you know missing the bus and being, you know all bummed I I don't. Maybe I just don't remember those things but, I mean, Yeah, it's you know my my memory of it is, you know, it worked fine. Today, yeah. I mean, you know i i've you know certainly been, you know, they do let me out of Boston occasionally my brother lives in in Chicago and I go to New York pretty regularly.

Interviewer: I love Chicago.

Interviewee: Yeah, Chicago is a great town, and I love, I, you know, they live close to a transit station and line that runs right down right down to the loop and so that's that's been great and, you know, so I like, I, I mean these kinds of transit heavy places like Chicago or New York, or even little less transit heavy like San Francisco. Yeah, or Washington. Yeah, you know i i enjoy those cities part, in part because of because of their transit systems they make them. It feels like without a transit system I kind of feel like it's not really a city, you know. Yeah, I hear at least, I don't know. I mean, I, we went to last and I haven't been to Los Angeles a lot but my wife and I really enjoyed it when we, when we went but, you know, I mean we had a car and we sort of felt you know rented rented a car there but. And so we didn't end up taking transit but I hear that evening in Los Angeles, like the transit, there's a lot more transit than you, you'd think. Yeah and but we you know, for whatever reason, we didn't avail ourselves of it we were on vacation so maybe that's part of it.

Interviewer: Gotcha. Amazing. So we're about three minutes over time here [*Interviewee*]. But, just wanted to say again thank you so much for making the time today

Interviewee: I hope this was helpful

Interviewer: Absolutely yeah. I'm starting to really understand, you know what what is at stake with the whole system and of course will compare all these interviews across the various teams. I guess the perspective of getting from you is from someone that like, essentially, comes to campus, very infrequently right now. And when you're on campus, you're pretty localized to your area, and then you leave at the end of the day. So I'm hoping we'll get you know various other perspectives maybe one on the teaching staff that like need to get around classes ... like that'll be interesting to synthesize yeah but it's been great talking to you.

Lecturer in Urban Planning

Q. Could you please summarize your background and research

Bachelor and Masters in civil eng at MIT, with a focus on transportation. Went to work for the city of Boston planning department after graduation. Took a year off in the city of Napoli, Italy on a Fullbright scholarship to understand how the Italian government was using transportation to stimulate economic development in Southern Italy. Later worked at the Mayor's office and became the Mayor's transportation advisor. Worked as a volunteer with community groups fighting the construction of city highways. Worked on his own as a planner while he was the advisor, he was able to continue advocating as part of his career. He was secretary of transportation for 4 years, and after they lost the election he came to MIT as a lecturer and research advisor. Later, after they won the election, he went back as Secretary of transportation for 8 years. Then went back to MIT as a lecturer and researcher at the center of transportation studies. The primary effort as Secretary was to implement some of the major transport initiatives initiated - extending the red line to Alewife, and Braintree in the other direction. Relocating the orange line. Revising contracts with commuter rail operators - operated through contracts with the private sector. Focused primarily on public transportation during the first four-year period, and began some of the conceptual work for the Big Dig, and adding a tunnel to the airport.

At MIT, worked on research in transportation policy, paid a lot of attention to contingency planning for disruption in petroleum supply - when Iran's supply became vulnerable for America. Had a grant from the Department of Energy. When he came back as Secretary, he continued focusing on public transportation - red line, commuter rail investments, completing environmental impact statements on the Big Dig. And winning the political fight with the Regan administration - who did not want to fund the project even though they had the right to be funded. A lot of environmental analysis and political work. They were able to override his veto.

When I came back to MIT, I have been working primarily on public transportation. I initiated contacts with real agencies, who funded MIT to have graduate students do Master's projects on real-world topics of interest - like a metro system for Puerto Rico. I developed a partnership with the University of Porto Rico. We then won similar contracts with the Chicago transport agency and the MBTA, and a small contract with the Basque area of Spain (San Sebastian).

Now I am substantially retired, I work 10-15% of my time at MIT and I continue to be part of the transit group. I am also heavily involved in private consulting for Harvard University on the question of how to re-develop the very old and functionally and structurally deficient turnpike in Austin.

Q: What are the problems in surface transportation in the Kendall / MIT area

There are too many cars and not enough people using public transportation. Not enough capacity for the transportation system. The Red Line is very helpful and essential to what's

going on there. But I think MIT has not been very thoughtful in some ways. While the university has initiated the mobility pass, so the ID card is also your Charlie Card, and is paid for by MIT. This has allowed the utilization of more public transport, and therefore not creating new parking lots, but instead building new dorms or laboratories. That program has worked very well.
For some reason, and I think not at all academic when they were putting the plan together for Kendall Square, it has included a roughly 1000-car underground parking garage, below what is supposed to become open space. I am not impressed with the car park under this space, as they will be below the water table, so it will cost probably over $120,000 per space and I find that inexcusable. I am quite unhappy with a lot of the things MITIMco is doing. When they acquired the space to reach Kendall Square about 10 years ago. MIT spent a lot of money to reach Kendall Square and got the station name changed to Kendall / MIT. They were supposed to use that space for more classrooms and graduate housing space. MIT has not made any progress on increasing graduate student housing space, but instead they got into the real estate business. MIT, after Harvard, has one of the largest endowments around, and has forgotten their research and education mission, in sight of their pursuit of real estate. Setting aside my philosophical objections, the 1000 parking spaces that they're adding will worsen the close to gridlock conditions that already exist. Now, after Covid, the parking lot at Strata is always full, the streets close to Kendall get grid-locked. Adding those 1000 spaces is exactly what should not be done since it will contribute to the Kendall traffic. On the positive side, the MBTA is purchasing additional redline vehicles to replace the old fleet which is getting quite old but also to expand it by approximately a third. They are having some issues with the delivery, but that always happens. They will work well and will substantially increase the capacity which will help a lot. The other opportunity is to get the state and the MBTA to institute a frequent rail shuttle from Austin to North Station along the railroad tracks - the so-called Grand Junction line. That rail car is a great opportunity for commuters attempting to come to MIT from the South suburbs. If there was a rail shuttle from Austin, to Kendall, to North Station, you could cut travel time by 30 minutes for the people coming from the West. The North-West is very well served with Porter Square. For the North-East they have to transfer at North Station to the orange line and then transfer again at Kendall?. If they had the Austin - Kendall - North Station, they could very quickly be at Kendall, and could dramatically improve the transit accessibility from the North, the North-East, and the West. The other point that shouldn't be ignored is the bus system in Cambridge. The city of Cambridge is not taking very good care of it, since they have prioritized bicycle operations and have increased travel times on buses, which is foolish, They could have improved the cycle transportation without harming the buses. MIT is very cautious about not saying anything critical about the City's work. The City is not being thoughtful about it. For example, on Mass avenue, the bus travel time has been worsened.

There are also shuttles that MIT operates, the blue buses. And those are useful, and they could become more important as the green line extension to Sommerville and Medford. When that opens, there could be some modifications to the Blue MIT shuttles that would allow people to transfer from the green line and get to Kendall / MIT quite conveniently from Union Square or Washington Street station. There's a lot of options to deal with the congestion that the 1000 parking spaces will add.

I think we will see more congestion no matter what happens.

Q:Are there opportunities to have bike lanes that don't impede public transport?

The big opportunity on Memorial Drive was discussed in the late 1990s but unfortunately did not get adopted. What they proposed, unsuccessfully, was to take the two directions on Memorial Drive, leave the Westbound direction essentially as it is, but relocate the eastbound direction into the middle of the green space - the big median. There would be some tree removal but I think the majority could be avoided with care. All the current land used by the Eastbound direction could be converted to a waterfront park so that MIT could have a waterfront park, like Harvard has. It could be a really fantastic asset if that were done. I think it could humanize Kendall. You could stand in Kendall Square and not understand or not know that the Charles River is near. That is absurd because the Charles River is a great asset. The large apartment building on the memorial drive is quite nice but quite old. There has been talking that that eventually needs to be replaced. Probably maintained for housing but it now forms a kind of wall between the river and memorial drive near Amherst Street. I think with some thought, about views, and pedestrians and bike connections, you could develop an understanding of just how close the Charles River is. And if they ever resuscitated the plan to create a park along with the memorial, I think the problem is not moving along Memorial Drive with a bicycle, as there is plenty of space, the problem is getting to Memorial Drive because it doesn't connect. That could make it better for bicycle riders, pedestrians, and students. There are going to be a huge number of private-sector employees at Kendall and they would all benefit from a connection to the river.

Q:How do you break down user groups and their needs and prioritize them when you think about planning?

I think it would make sense to look at the numbers of people who are using each mode. I tend to think in quantitative terms. When I was teaching an Urban quantitative planning course, I was counting these people. And the number of people in public transportation is far larger than any other mode. In the politics of Cambridge, the bicycle advocates have much more power than their number. The attention paid to bicycles and the attention paid to buses is not at all consistent with the numbers used today and the numbers used in the future. In Boston, with the support of policy advocacy groups, they have been installing shared lanes between bicycles and buses. Some cyclists don't like that since they argue that it is a bit scary to be in the same lane as a bus. I don't mean to trivialize bicycle safety, but I would encourage the bikes to use quieter streets instead of large streets like Mass avenue. However, the buses and trucks don't have an alternative, whereas bicycles do. We have to look at the constraints and recognize how constrained the space is. In Manhattan, they dramatically increased the space for cyclists and pedestrians, but they were able to do that while maintaining reasonable space for autos. That condition does not exist in Boston. There's some tendency for advocates to say that the automobile is the least important, but someone is using them. And you need truck access, and the buses have no alternative. We need to look at current traffic flows by mode and what alternative each mode has. I don't pretend that you'll have no bicycles on Mass. Ave. But the

people who are more ginger can use green street or bishop Allen. But inevitably, somewhere on your path as a cyclist, you will confront buses, trucks. The intersection of the streets is critical since it cuts the flow time in half, and everyone conflicts. You have to look at the tough spots, not the easy spots. I always try to assign Central Square for the trucks. They have nowhere else to go. We have to look at all these modes and ask if they have realistic alternatives. And if not, something has to give. The bus and bicycle lanes that are part of Boston, have bus frequencies that are not so high. The compromise is that the bus drivers need to drive slower since they are sharing the lane. But they get the priority at the lights. So they can't argue if the bicycles are being rational or not. And you have to anticipate that there will be riders that make mistakes. And they are very vulnerable, so bus drivers need to get training on this. But if you give the lane to both, you have to be careful to train people.

Q: One of the things we see is electric scooters, electric bikes, etc. Does that change things?

It makes it more complicated. They have small wheels and we have so many potholes so it makes things more dangerous. So we have to understand that this will be part of the environment. The best thing to improve safety has been the adoption of a 20 mi/hr speed limit. If the autos, buses, and trucks are moving more slowly, at least they have more time to react. Pedestrians are also of all kinds and there are J walkers. I think slowing down to a 20-mile an hour speed limit increases reaction time for the driver. There's a difference between an accident at 20 mi/hr and 40 mi/hr. So that's been a step in the right direction.

Q:What are the positives and negatives of traffic calming?

I think some of the traffic calming is generally a good idea, but it depends on how it's done. Some techniques might be gimmicks. The tendency to raise the level of the street to the level of the sidewalk and neck out the sidewalk and presumably reduce the length that the pedestrian has to cross. These can surprise drivers - extensions of the sidewalk and humping on the street. A driver can lose control of the car if they don't expect some of those things. I think that's kind of foolish. You can get the drivers' attention if you put some rumble slip in without changing the slope they are driving on. When you change the curves to neck out the sidewalks, you are very likely to ruin the drainage. We have very variable weather, and if there isn't proper drainage, you end up with puddles of ice which are very dangerous and don't improve conditions for pedestrians. I think the idea of traffic calming is very good (the 20mi/hr speed limit). I think that rumble strip can be very effective. I think moving curbstones and changing the level of the street should not be done or should be done with a lot of caution. This can create surprising situations for drivers and cause accidents.

Q:Does Snow factor into planning?

I don't think there's so much of a physical infrastructure solution. All the municipalities are pretty good at getting out and removing snow. They do less of a good job of repainting the white lines in the spring. Often after winter you cannot see them anymore. There needs to be

more attention to paint, and also to repair potholes, which often takes way too long to get done.

Q:Speaking of lining roads, autonomous vehicles need lines. What are your thoughts on the future of autonomous vehicles in MIT/Kendall?

I'm a skeptic. I don't think they are desirable at all. We have so much chaos already. I"m very dubious that the autonomous vehicle is gonna be useful. In order to prioritize safety, they are going to have to program the autonomous vehicles to avoid hitting pedestrians and bicycles. And so once bikers and pedestrians learn that, they will just walk in front of it. And the pedestrian and bikes will win every time since the vehicle will just stop. If I have an autonomous car, the idea is it could drop someone off at MIT and then go home. So the car can be used for someone else instead of it being parked, and you could reduce the demand for parking but increase the demand for movement. So I don't think that the autonomous vehicle will help us much.

Q:How do you see more sustainable transportation uses changing the shape of our streets and sidewalks?

The use of the streets will be more of what we've seen, hopefully more thoughtfully. It would be desirable to have more consistency. In each city, and almost every street, people tend to take individual problems and think of methods that are inconsistent, and use methods that can be inconsistent from one neighborhood to another. Bus drivers are trained but confronting automobile or truck drivers with different situations can be dangerous. For example, there are bus-bike lanes in Boston while Cambridge won't hear of it. There should be some greater effort to achieve reasonable uniformity so that bicycle riders and automobile drivers know what to expect.

Q:How can regulation impact surface transportation for the mixed-use lanes?

Some cities are considering legislation to support more bicycle lanes but requiring bicyclists to get a license. I'm not sure it's gonna work. It's worth considering and seeing if you can make it work. I'm not sure if that's a good solution. Some people will just refuse to play, like for vaccination. It's going to be hard to enforce.

Q:Can you comment on studies that say autonomous vehicles will reduce emissions?

In order to reduce emissions, there is a flaw that was built into the corporate average fuel economy, so-called CAFE standards. Back in the 70s, when the Iran petroleum crisis occured, there were discussions about technologies that exist to improve fuel economy. There was a lot of debate about why we are letting companies sell pickup trucks that get 12 miles a gallon and let's just require 25 miles a gallon minimum standard. But the auto industry went nuts and said if you do that, the American auto industry will close down. Basically, their argument was,

American manufacturers couldn't compete with more fuel-efficient Japanese cars. Only the Japanese will know how to make such vehicles and they will win the entire market and we will be dead. You could hire some Japanese engineers in that case, who might be able to help you figure out how to make better vehicles, but what they did, because of this, was a foolish argument that the American auto companies couldn't possibly compete with smaller, more fuel-efficient cars. They adopted this average (CAFE standards). For every one fuel-efficient car your sell, your reward is that you could sell a pick-up truck so that we would be OK on average - which is absurd. If people were driving hybrids, we don't have to get all the way to electric vehicles. But they're still selling pickup trucks and SUVs, and the engineering has gone into adding weight and speed/performance. Fix that first. Self-driving cars are just a distraction.

Q : Re-focus on campus: if you had access to the money (unconstrained), what would be one thing you would do on campus to make MIT surface transport better?

I would pay a lot more attention to the circulation of the buses. Things are getting better in the pedestrian realm, and that should continue. Because of the history of MIT, we got these linear modes (river, memorial drive, grand junction railworld) but not too much cross-capacity. I would try to get better connections across, particularly to the river, which is an amazing asset. I don't think you could do things overnight. But I would decrease automobile parking gradually. Parking is really a deadly use. If it's up a garage up in the air, it's ugly, and it's occupying space that could have been a building and that's a total waste. A surface parking isn't a bad temporary use because it's not a permanent commitment to the land. Underground parking solves the design problem but is enormously expensive. I would definitely prioritize getting the Grand Junction activated and I don't think MIT should pay for that. MIT should first and foremost provide more housing for its own students, in particular graduate student housing. It's not sufficient. It's not good for graduate students to be facing long commutes and they are competing with low and moderate income people for a limited housing supply. Providing more housing opportunities at or near housing would be really important. It's good for students, it reduces the need to use a vehicle at all to access MIT, and it eases the pressure on the general community. I think MIT should put some money into its housing policy first. The shuttle service is good.I think there is not much collaboration with the MBTA and I think there should be.

Q: What transportation technologies do you think will change the industry?

I don't want to be an expert on vehicle technology because I'm not. I keep hearing about the different possibilities to electrify trains. I know there are techniques, even one developed by a professor of engineering at MIT, about 15 years ago, where you could charge batteries on battery-powered trains at each station, and get substantially electric service. Maybe with a small, hybrid vehicle, but most of the electricity could be coming from charging at stations rather than wires. I'm not an expert, but everyone tells me that you get better acceleration and deceleration with electric trains, and cutting diesel fumes. I keep hearing that Hydrogen could be a potential solution. While some of the European rail systems are looking at hydrogen cars, I don't know how that works but I think those technologies would be interesting to explore. The battery bus - my understanding is they're working pretty well in China and in areas that have

warm climates. Chicago is talking about it but they have cold winters so I'm questioning how well that will work. Electric or hybrid buses have to be reliable as a basic function. The MBTA has often been criticized for going for a shiny-new object that has not yet proven itself in various weather conditions. We need to move away from diesel, but with vehicles that have the functionality. The good thing with the diesel buses is that they work, but with too much fumes. We want to get rid of those downsides, but we want vehicles that work.

On the automobile side, I would prioritize reducing the weight and getting much better fuel economy. Getting all electric only makes sense, if we've expanded the capacity to the grid. If you've expanded the capacity of the grid and you've got wind and solar and clean sources. In China, they have electric buses but they're burning coal to make electricity. Expanding the grid is much easier said than done. We need intermediate objectives. Can we have much more efficient automobiles without going all electric. How can we increase hybrid / electric vehicles without putting too much pressure on the grid. I'm interested in these intermediate steps that would make progress on reducing pollution, but not necessarily going to the perfect solution without thinking about the system effects that we have to have a grid to support that.

Additional Stakeholders

Kendall Square Association, Full Transcript

[*Interviewer*]: Please tell us about yourself

[KSA Officer]: *I'm the Senior Director of Strategic Programs at the Kendall Square Association (KSA). And what that means is that it is my job to spearhead our three strategic initiatives. The one that's most relevant to this conversation is Transportation, but I'm also working on Diversity, Equity and Inclusion initiative.*

So, for Transportation, basically, we've developed a two-pronged approach. So, we're leveraging the voices of our membership. The KSA represents small to large employers in Kendall. We're leveraging our membership to advocate for the increased revenue that we think needs to be delivered in order to really enhance our transportation system. So that's not just transit, that's also the roadways and bridges, thinking about the whole thing as a system. So, we're really a leading voice in the business community on that front. That's a long game, right? Advocacy is always a long game.

What we also have done is developed a short-term strategy to empower employers to really experiment and create some fun pilots to help 1) people feel empowered about their commutes. One of the things we know from polling is that a lot of people think we will never be able to change it. It's a problem that's just going to exist forever. And it's bigger than any one of us.

So, what we want to do is tell people: yes, you are empowered to change it, have a little bit of fun with it, and then share some best practices and be really nimble. So, that strategy is called the Transportation ADVANCE. So, I've pulled together 18 companies so far from across Kendall that represent a little over 18,000 employees. Our first meeting is in early November. And what we're doing is those 18 companies are sharing some baseline data with me in a neutral way so that we can look at what are the existing practices. So, if some companies are fully subsidizing parking, but only partially subsidizing transit, we'll be able to look at that and say, like, yeah, there's some common sense here. So, we're hoping to uncover some of that.

The other thing we're hoping to do is get some basic data on where people are commuting from. So, we know that [it is] probably between 65,000 and 100,000. Now, I know that's a huge gap. But the 65,000 people who work in Kendall that come from 2013 [data set]. And we've had several million square feet of development added in those years. So, it's really hard to put a fine number.

But what we're also trying to understand is where are people coming in from so that way we can identify what are the actual system or network challenges that are impacting these people as well. So, on one hand, what are the incentives that companies are giving for using different modes? On the other hand, what are the obstacles to becoming someone who takes the train, right? So, I'm in the middle of that, which is crazy.

We're also pulling together these pilots or the experiments that we're going to use with employers. So, I'm talking to platform companies, more traditional transportation agencies, like MBTA and Volpe Center, on how do we create some solutions. So, in an ideal world, which I have no idea how I'm going to pull this off, but like they can sound like I know what I'm doing, I'm going to be able to design and execute some interesting pilots in a data-driven way that will hopefully demonstrate some movement or not towards adoption of transit and others more sustainable forms of commuting.

And hopefully, with that, I'll be able to execute a public awareness campaign that engages people and empowers them and makes them feel more positive about the state of transportation. So, I'm managing both of those projects right now. Transportation, as you guys know, is a SUPER complicated issue. And there's a lot of moving parts. So, we'll see. But hopefully I'm hoping to work with some of your colleagues, not at Sloan, but at ADAS, to help me do some experiment and pilot design, which will be fun.

[*Interviewer*] You mentioned two-pronged approach. So, ideal situation for the short term and the long term. Are those two separate things and are they one and the same? And what would you say those look like?

[KSA Officer]: *So, I think they're related. So, the short term is about what are the small quick adjustments we can make to ease some of the pain, right now, and then what are the lessons can then apply to the long term.*

One of the things that's important to understand about transportation in this state is that we're not inventing the wheel, right? Like we already have all of the pieces. We don't need to come up with like a brand-new superhighway; we're not inventing public transit, right? We [had] invented public transit. We did it 100 and some odd years ago, we don't have to do that. Now we just have to make a system that works. Right? So, there's a lot of

common-sense approach when you're talking about the system from an infrastructure perspective, right? So if you're going to shut down the Mass. Pike or reduce flow of traffic on the Mass. Pike for like 20 years, as a result of the I-90 realignment project, you should probably invest in the Worcester Line and give people the option to commute on the train. Right now, this [left] hand and this [right] hand aren't talking to each other like that at the state level. So that's the advocacy piece. That's the like, "Come on, guys. Just like, give us the system we deserve." The short-term piece is about like making sure that the businesses know A) that they actually have stake in this, like this is important to them, because that helps with the long term advocacy strategy, but B) really connecting people and the choices that people are making today to those big infrastructural problems. Right? So, it doesn't matter if I'm on the long term solution, I'm going to deliver a much better Framingham/Worcester line. It doesn't matter if you're never going to get out of your car anyways, because you think it doesn't matter. Right? So, I see them as being connected and informing, really informing each other, but I think the short term will hopefully help us come up with some powerful solutions for the long term.

[*Interviewer*]: What are the challenges that KSA has faced with regard to transportation and what are the challenges that you foresee are facing in the future?

[KSA Officer]: *Lot of the challenges we have are 1) establishing credibility, right? So, we have to signal to these major companies that we are a credible partner and doing this work, which is hard because we're a small nimble organization. I'm not a planner, right? I don't have a Masters in System Design. So, we have to fall back on showing a little bit. So, we've spent a lot of this summer elevating our messaging. And I'm not going to say that we did that on purpose either, right? Like, sometimes you just have to start walking and see what happens. So that credibility is important.*

The other thing is understanding what the obstacles are. So, one of our goals is to get these major companies to collaborate. So, what are the obstacles to that collaboration? And they compete with each other. They don't want to share their data and information because what makes them different sometimes is the benefit packages that they have to offer in this incredibly tight labor market. They're competing for the same thing. So that is really hard. In some ways, it was easier than we thought it would be to explain to them why transportation was important to them, because they were already hearing it from their employees. Right? So, I think that there was a real benefit that came from that.

The other obstacle we have is finding the resources to leverage the professional skills that we need, right? So, I can't do this by myself, right? And I can't hire a team of 15 people. So, I need to be really thoughtful about what's the budget that I have, and who are the consultants that I bring on to really support like, where do we really need support? What can we handle internally and what we can't? And that's been a hard question to answer as we're growing as an organization.

So, in the past year, I'm a new hire. I think there's only one person on our team of six who's been there for more than a year. So, we're very new and onboarding new people and new skill sets has been hard. So, my colleague you guys met when I was walking in. This is her fourth week on the job. And she's our Communications Director and a major piece of what we're doing with the ADVANCE is communications. So, I needed to know when she came on, is she a media strategy person? Is she a branding and marketing person? And figuring that out was hard. And it's also one thing to understand what people said what their skillset is. But knowing, like an experience, is very different, right? People are always very self-aware. So that's been a major challenge for me.

I think another thing I'm really nervous about is how do I deliver something of value. Like really putting the flag on the ground of what success looks like in this [and] understanding the impact that I can have? So how do we not overstate the impact we can have by still delivering something of value? And designing this was challenging. We were lucky; we got a great grant from the Bar Foundation, which helped. The Bar Foundation is great.

[*Interviewer*]: Are there any other specific areas of improvement that KSA is particularly focused?

[KSA Officer] *Oh, that's such a good question. So, from the infrastructure and advocacy position, we released a report called Transport Kendall. And what Transport Kendall did was: it looked at all of the other planning that's happening, and there [are] plans for everything, right? Looked at all the other planning and said, okay, where can we add to this conversation? What's something that we can elevate or highlight to really make sure that it's resonating and ties into our goal of keeping this a really thriving ecosystem?*

So, from that report, we generated three priorities. And those priorities don't mean that we don't support anything that's outside of that. It just means this is where we thought we could add the most value.

The first is improvements on the Red Line, and the Red Line is lifeline for Kendall. You guys understand that. We know we're going to have an incredible increase on people boarding at Kendall Station. We've already had an

incredible increase. So how do we literally deliver a system that can manage that capacity? And right now, the MBTA and Mass DOT are not meeting their promises on that front. They're like years behind on delivering things, which makes sense, right? Like we have a SUPER old transportation system. And Deval Patrick, in 2013, said, we're going to buy new cars, which was great, except for it's like you bought a really cool old historic colonial house. And instead of replacing anything, you just said that I'm gonna buy a new stove. You can't just take one out and put a new one in because you're going to discover that your wiring is faulty and your gas line doesn't work and you're going to burn your house down. So, as we're seeing, we're burning our house down right now.

The other important one is buses, which is great because this has been a major strategic initiative for a lot of our partners. across the Commonwealth right now on bus rapid transit. We've had like a 400% increase in growth in Kendall in the last 20 to 30 years. And we haven't added a single new bus line, a single new route of service, right? We haven't done anything to prioritize buses for this community, which is just a no brainer, right? Like, as far as Infrastructure Improvement goes, buses should be where everyone starts because it takes a can of paint, right? Like it's not crazy.

And then the third piece, which is my favorite, is the Grand Junction Rail Line. So, the Grand Junction Rail Line runs from Worcester to North Station. It is an existing freight line and it runs, what's interesting about it, the Worcester and North Station Connection is [that] it runs through Austin, through Kendall to North Station. So one of the worst connection points in our existing transit system right now a ton of Service comes in from the West and the South to South Station. And we know we have a capacity problem at South Station for commuter rail, right? Only the North comes into North Station. So, if we could do the Grand Junction, we could actually connect people from the West to the North and to the South, which would be huge. We talk a lot about that, from the perspective of unifying this, like Economic Corridor that we've built, right? All the way from Worcester. And what's happening out there, Watertown, Waltham, think of the Charles River, and then obviously, Kendall, which is probably one of the major regional economic hubs, right? I mean, tens of thousands of jobs, just everybody wants to be here. And they're not going to want to be here if they can't get here.

The Grand Junction is pretty incredible. And we need to realize a lot of opportunity around that too, with Harvard's development over on the Halston side. So, I love the Grand Junction. It's fun because you don't often get to talk about adding new trains, like that's not really something that people do unless you're putting in a light rail system. So, we get to talk about adding new train. And we do that because we have an existing track, right? Like we don't even have to, there's no eminent domain, like just put trains on the track. So that's pretty cool. Yeah, I mean, it's still super complicated, right? And you can like the Green Line Extension, and there's a history. The Grand Junction people been talking about it. But there's a lot of political history on that.

[*Interviewer*]: You've ever been in Norfolk, Virginia? There's like the same exact thing, with building a light rail system. I am from there. It's just funny seeing that, what it sounds like, very similar issues.

[KSA Officer]: *Totally! Well, it's like South thing, South Coast rail. It's a similar thing in Mass. Yeah. It's, I mean, trains are great, right? Like, I don't want to have to drive everywhere. You know, eventually I'll be like a hockey mom or something and it will be hard for me not to drive everywhere. But in the meantime, like it's really nice not have to drive everywhere. So yeah, I think that's, that's awesome. And no offense to hockey moms. They're wonderful. And how they car around that equipment. God help them.*

[*Interviewer*]: You mentioned, we've forgot improvement on Red Line that you guys have done some forecasting. Yeah. So just know to probe a little bit deeper. How does KSA go about doing the forecasting?

[KSA Officer]: *So, we don't, because it's not something we have the internal capacity to do, but a lot of planners will do that. And so, there's a couple of people that are super well known. One of our partners in writing Transport Kendall was the Cambridge Redevelopment Authority, has an amazing planning team.*

But a lot of times, and this is actually this gets really interesting, right from an advocacy perspective. So, there's this group called CTPS and CTPS does a lot of the modeling. Have you guys heard about them? It's okay, if you haven't I just so they do a lot of the modeling about like ridership, like who's going to ride these things? So, what will often happen is in a community process, advocates will be like, we want to train, we want to train and CTPS will come and they'll be like, fine if you build a train and four people will ride it. And the advocates are like, how did you do that? Like, you just took like, you black box a number and it came out. And that's crazy. So, it's been really interesting to see some of the forecasting be wrong.

One thing I think that the advocates really understand, and this is where like, forecasting is a tool for planning, but it's also really a tool for advocacy. In this case, because we're looking at this number, and it makes sense, right?

Like Kendall is growing. Parking is decreasing. The number of humans we have to get here is growing. So, it only makes sense that more people would want to get on the Red Line.
Now, are there a ton of things that could happen that could make that not come true? Like, yeah, absolutely! Like the governor could continue to not invest in the Red Line, the Red Line could catch on fire. And it could be super unsafe and no one would ever take the Red Line again. Kendall would also die. So that would be terrible. But yeah, there's a lot of things that could go wrong.
CTPS [is] very interesting. And there's actually a cool connection, the one of the transportation planners from the City of Cambridge, her name is Tegan. She's leaving the City of Cambridge to going to be the Executive Director of CTPS, which is going to be like, super interesting, because for years, she's like, been one of the top advocates on a lot of this mobility, like in network mobility stuff. So, should be really fun.
[*Interviewer*]: Yeah. Are there any particular, because you mentioned about trials on the pilots, so, are there any particular ideas that KSA is particularly interested?
[KSA Officer]: *Oh, that's the million-dollar question. And so, this is the hardest part of what I'm trying to do right now is designed these pilots and it's the hardest part because I'm not the expert who can do this. So, I'm trying to secure a pilot design partner.*
So, I've said generally that our pilots will fall into some big categories, right? So one category is best practice. So, our pilots will share best practices among our companies to see if they can do any little shifts internally with their benefits structure, how they're charging for parking, to make those matches.
The other one is will use new technology. And that's like platform companies, right? Like Waze has a carpooling platform that they're going to pilot with us. That's great, new technology and new platforms, we have to be early adopters, this is Kendall. That makes sense.
And then the third piece is Smart Infrastructure. So, what are the infrastructure adjustments that we need to make all these things work really well. It's harder to give an example of that outside of something that you might have seen before, right? Like a dedicated bus lane. So, first, I'm trying to, everybody agrees that transportation is a problem. But that's a really big problem. So, part of why I'm talking to all these companies right now is to try and narrow down what are their specific problems? And then what are the commonalities in them, so that I can start to define what I'm going to work up against, right? Because I can't claim to solve transportation. If I could, I'd be running for governor. Or the governor would argue I should run for president because apparently, he just thinks the federal government should solve all of our problems.
[*Interviewer*]: So, I kind of want to narrow it down a little bit. So, looking at the people, groups of people that you, kind of, you've alluded to, so who are people that, who are the stakeholders, the people that have something to offer to you in pursuing the goals that you've talked about.
[KSA Officer]: *So, we define the stakeholders for the Transportation ADVANCE campaign as being, of course, our companies.*
And the companies are broken into a couple layers of stakeholders. So, there's think about it as like the C-Suite level, strategic decision makers like stakeholders. And then the employees and potential employees as major stakeholders there. Right? So that's like one kind of small bucket.
Another small bucket is elected officials, and other important government stakeholders at the City of Cambridge and in Massachusetts, so that's a very like micro level.
So, drawing the bigger circle around that; it's our immediate neighbor community. Right? So, people who live and work in Cambridge; people who are somehow connected to this and invested in it. Going from there. our stakeholders are similar organizations to us. Right? So, who are business organizations that are working on things like this across Massachusetts? And then we have a more national and global audience, which are other innovation community leaders. Right?
My amazing colleague has worked with me to develop a comms plan, that's going to have a strategy for each of those stakeholder groups. Right? Because you connect with each of them in a different way. That's going to be a lot of content to deliver.
[*Interviewer*]: So, differentiating the stakeholders then from the people who are going to going to directly benefit from this. So how do you, I guess, 1) who are they? And 2) how do you reach them? And how do you get, you know, that information needed to forecast to kind of appreciate what their needs are?
[KSA Officer]: P*art of what a calm strategy is, is designing how you're going to tell everyone how the work you're doing is benefiting them. Right? So there's real versus realized benefit.* W*e're going to craft a strategy that says the*

work we're doing is benefiting all of you either directly because we've shared these best practices and your employees are happier, or indirectly because we provided you with political cover and now you have some great ground to stand on and something to point to as a success story, or even further indirectly, because we've created a model for how you can engage your business leaders and your employees.

And then even up a next step, because we've pulled out really interesting insights that are going to further your thinking and thought leadership on this. Right? So like, we're trying to answer that for everyone. And then we're trying to craft content that makes the most sense for them.
That being said, like there are some stakeholder groups that it's really easy, like elected officials, I could just go to an elected official and be like, "Hey, what do you need from me in this?" As a frank conversation? And it's pretty easy. Right? And they might say, like, "I need political cover for congestion pricing." Like, okay, cool, very transactional, very easy, very one-on-one relationship. I can't call the people who are running London's Innovation District, or maybe I could, it's harder to call them and be like, "Hey, guys, trying to solve this wacky transportation problem over here in Massachusetts, and I want to create something of value to you." How do I do that? So instead, I have to look at what are the forums through which were already interacting. And not a lot of that is like conferences and storytelling and like understanding what are the typical modes of interaction with some of those audiences. I'm not saying that the delivery and all of that is going to be perfect.
I think you have to prioritize, right? Like we're a small shop. So, I think our priorities are going to be the companies, their employees, and then our immediate community. Elected will quickly fall into that, right? Because if you're talking to their constituents, you're talking to them. Other business groups will quickly fall under that, because if we get enough attention on this, they're going to want to develop from our model. But some of these larger partners [are] way more of a stretch goal. And it's the first time as an organization that we've taken that on, so trying to be really thoughtful about how do we communicate with them.
[*Interviewer*]: Would the way you approach those different groups, people, you know, businesses here, people that commute in, would you approach them differently? Would you have any different forms of getting information or recognizing their needs?
[KSA Officer]: *So, I think I'm a comms person, right? Like by training. So, what does it mean? The only tool you have is a hammer, everything looks like a nail. So, for me answering that question is about audience segmentation. And how much capacity do you have to segment your audience and deliver curated messages to them? And I don't have a ton of capacity on that, because I'm not in a resource rich position. So, I need to think in the most general sense about what's resonating with people.*
And then I need to think about how I'm talking to those different audiences. So, the way that I'm going to set up a table and interact with everyone who works at the Broaden Institute. And the messaging that I'm going to deliver to the Broad is going to be different than the added messaging that I'm going to buy on the MBTA Red Line, right? But they're going to come from the same central messaging thesis, right? Like those core messages are defined early on, and then just applied differently. So, I think that, in an ideal world, like you could go as far as like having segmenting your audience, defining your populations, doing thoughtful focus groups, with each of them, trying to extract some insights and then developing and if you were going in a really systematic way, you could do that. It would take a lot of resources, a lot of energy and a lot of time. So yeah, that's why you have to prioritize.
[*Interviewer*]: What resource deficiencies do you have?
[KSA Officer]: *I think I mentioned earlier, so yes, like, there's the financial element. But for me, the financial element is a means to an end and the end is the brainpower, right? Like, I want the smartest people who I can find to be in that room designing great pilots. And then I want the smartest people I can find creating an amazing marketing campaign that helps me achieve these goals with these sorts of segmented audiences, right? Like, I want those people [that] I need. For me, the resources are about building my capacity so that I can deliver on this whole project scope. So those are the most important resources for me right now is definitely that pilot partner.*
And also, you know, being in Kendall, we are resource rich from a perspective of we have a lot of institutions with money that can invest in these types of things. So, I was able to leverage that to raise additional funds from the working group. That being said, like, this could be an incredibly expensive thing, right? Like, the budget that I designed for this wouldn't even be enough to just run the Easy Ride system that we currently have.
Its always valuable, learning from other people's experience, so we're trying to tap in. MIT did a really great job running some cool pilots last year on incentivizing how people, changing people's parking habits essentially. So, I like trying to find the actual guy who like ran that.

And then the other, so it's money which gets you people and the other big resource that you can't create more of is time. I would like kill for another 72 hours, like just whole 72 hours to do this. And that is really hard because this project is a third of my job. Right? I am managing two other strategic initiatives. So how do I sit there as someone who's managing all three of these things and communicate it to my boss like, yeah, so I'm going to kill it on this, but I'm also keenly aware that I need to develop a work plan. Placemaking for 2020. So, managing that is super hard. And the time just to like sit down and even.

So, my boss [provided] some big feedback that I got this week. We do check ins every week and we talk about what are the goals? What are the things we need to walk out of this week with? And she was like, you need to walk out of this week with a project plan on the Transportation ADVACNCE. Now mind you, I have a project plan, right? Like I've written grant applications, but like a week by week plan, because I need a really easy way to take everything that is in my brain and communicate it to my team and like a workflow so that they know, you know, our Events and Operations Manager knows to hold four hours on CA schedule because I'm pushing a press release and CA is going to need to be available for comment.

[*Interviewer*]: What are the ideal attributes for the transportation system that can be packed in Kendall Square.

[KSA Officer]: Yeah, importance. I would say number one most important thing is [that] it moves people efficiently. Right. And I know that that seems really common sense. Second, most important thing is that it is resilient and sustainable. And that's not even something that any of us know how to scratch the surface of the conversation on yet, which is like sea level rising, we're right next to a river. How is that going to impact the T which runs underground? I think those are by far the two biggest attributes. So as long as you're hitting those points. The third thing would be something that's sustainable from a revenue and capital construction perspective - I don't want to have to have a revenue fight every time I need to add a new T station. It's just not worth it.

[*Interviewer*]: You talked about trying to reduce our commuting time in our background reading. Then it's also to maximize tech workers' time. What other goals is KSA interested in achieving through ADVANCE?

[KSA Officer]: I*f we could move the needle on that, that would be a huge deal, right? So that, right now, we know we have the worst congestion in the country, losing 164 hours per person per year, sitting in traffic. Like the tens of thousands of dollars that are being wasted, or people sit in traffic. Like, think about what we could do with that instead. So, I actually don't even know if I'll be able to move the needle on that. Even through the ADVANCE.*

It would be great if people just enjoyed their commute a little bit more. So, you know, I could push out some interesting biking projects. Where, yeah, if you drove on a day with no traffic, it might take you 20 minutes, or that's actually unrealistic. Let's say if you drive on a day without traffic, it takes you an hour and if you bike on a day without traffic, it takes you an hour and 20 minutes. But if you drive on a day with traffic, it takes you an hour and 30 minutes. I'm still counting it as a win. As long as you feel like you're empowered, this is successful, you're making the choice to commute. It's important if people feel they have options - a lot of people don't.

[*Interviewer*]: What key performance parameters that you're looking at.

[KSA Officer]: *Trying to define those right now. Yeah, so that's why I like talking to the companies and finding out what their top problems are is so important for me, because I need to be able to define the problem. So, once I define the problem, and I create some design principles for these pilots. Right? Then I'm going to need to create a framework for evaluation. And I want to have buy in from the companies and what that framework for evaluation because that is like an actual tool that I can deliver to them immediately.*

I just did in Placemaking right now. We just came up with this framework for Placemaking, which is, sorry, it's just on my mind right now, actually, I did a presentation and talked to 500 people, we got a whole bunch of stuff extracted all these insights, we had a set of design principles that were made by our working group. And then I turn it into a framework for evaluation, which is a little bit of magic, right? Because it's like one part, design principles. One part, what the community says that they want. And then one-part organization values.

Right. So, for us, design principles say inclusion. Super important, right? Community didn't say like, we want to be a more inclusive place. Because that's not what humans say. Like, if you could wave a magic wand, that's not how people think about the build environment. So, then I had to say, but by the way, guys, in our framework inclusion is really important, because none of this will work if people don't feel welcome. Right? So, it's that framework stuff is hard. If you guys have like, any way on how to do that, let me know. I'm struggling.

[*Interviewer*]: There's a lot of moving parts, and that you have a finite amount of time and resources. How do you decide? Kind of how to proceed and what you're going to address first. How [do] you prioritize?

[KSA Officer]: P*rioritization comes from understanding your opportunities and assets. First do the lightest quickest win, and then longer-term something that addresses an opportunity. If I look at all this information, and I find out*

that there are 10,000 people who are driving in from Lexington every day, if I can get 1% of those people commuting a different way. It's realizing that I have this central node that I'm building off of.
The opportunity piece is a little bit more complicated because if what we realize is that buses are just super inefficient because the congestion is so bad in Kendall that no one's taking them, turning that into an opportunity is going to be, transitioning the opportunity of having bus service into one that makes bus service more efficient is going to be more complicated because of the stakeholders involved in making that happen.
The other way functionally that it's going to happen is the working group will decide where to put the energy and resources. Obviously, whenever you have a group like that, you steer and you guide them. But ultimately, if they don't have buy-in in what you're going to do, you're not going to be successful. So, you have to develop it together.
[*Interviewer*]: Is there a mechanism in place for you and the working group to check back in with the users?
[KSA Officer]: *That's a super good question. So, I haven't developed that yet. But I think that I need to, I mean, cool thing is that it's a really small group. So, I'm already trying to develop these personal relationships where people feel like they can just reach out to me. We're super survey-heavy organizations, I imagine I'll need to create some surveys that will go out after each one of these meetings. But beyond that, I don't know if we have something that we've used as a formal checking mechanism. So, there's informal communication.*
[*Interviewer*]: What are the short- and long-term planning horizons?
[KSA Officer]: *Short term are things that we can do in the next 18 months and long term are things that we can do. There's actually in my thinking, there's no medium term. So, 18 months is the short and medium term; long term will probably be things that are between three and 10 years out. Beyond 10 years people don't understand it, really once you get beyond three years people don't understand it, but with transportation, you need a longer horizon*.
[*Interviewer*]: Last October, KSA did the Future of Transportation Showcase. What did you learn from that?
[KSA Officer]: *So, I wasn't actually on the team when we did that. But what I can share is that a lot of that the future transportation showcase is about micro mobility and smart cities. So smart city is this like huge pyramid of things. And there's actually we had a great panel event last week on this. But it's about the new technology, the gadgets, the new platforms, the way that we can streamline and use technology to help, which is I think part of why that's one of the pillars of our pilots is because this is a very technology forward community. But yeah, micro mobility. Everyone's very interested in that right now.*
[*Interviewer*]: So, you have Transportation Summit coming up in 2021? What do you hope to bring? take away?
[KSA Officer]: Sure. I do. Absolutely. I'm going to plan that in like six months. W*e set the Transportation Summit. We created that as an idea as a way to hold ourselves and this process accountable to the idea that we are going to story tell, we're going to share data and we're going to be really thoughtful and how we curate this, right? It's one thing to just be like, Oh, yeah, we're going to do some pilots. And then like, we can sit in a small room and see if it works. But that won't ever have legs beyond that small room unless you can package it into something that makes sense. Building the summit in at the end of the project keeps us honest all the way through.*
The goal for the summit will really be to like engage them, okay, like I would love in an ideal world who knows if this is going to happen. But wouldn't it be cool if a couple of the working group companies were so interested in this or found out something so cool by changing this, that they're actually the one standing up at the summit telling the story? Right, like, that would be engagement. It's a win, right?
[*Interviewer*]: Are there anything that you any studies or documentation literature that you would recommend?
[KSA Officer]: T*here's some really great studies that came out of MIT about their parking work that they did.*
[*Interviewer*]: Are there any other initiatives that KSA has done with regard to transportation.
[KSA Officer]: T*ransport capital is something you should look at. We brought together 40 CEOs from Kendall, who signed a letter to the governor, speaker and Senate President, saying this is important, let's get it together.*
We also have a group that meets every month called our Transportation Learning Community, and the TLC, as I affectionately referred to them. They work hard to get pretty smart on these transportation issues, and it's anyone who's interested. So, last month we had a transportation revenue presentation from someone at a better city. This month, we have a presentation from the executive director of the commuter rail on the rail vision plan. Next month we partnering with Walk Boston to do a presentation on walking audit of Kendall. We manage those every month.
W*e were really involved in the Longfellow Bridge work. We're on the executive committee for the transportation for Massachusetts Group, T for MA, and really involved in combined business advocacy efforts. We hosted a forum a couple months ago, called the Get Smart on transportation revenue and have a write up on it.*
End of Transcript

Aptiv: Supplier Interview – A global auto parts company targeted around autonomous driving

1. Please tell me a little bit about your background, and how you got to this role?
Work at Aptiv-Autonomous Mobility with background in mechanical engineering and automotive. Aptiv aligned well with my interest and experiences of working in both automotive and robotics.
[Note from the Interviewers: This answer has been heavily edited to remove identifying information for this stakeholder. The full answer has not been provided in accordance with the instructions for OS3]

2. What is your take in having this system becoming reliable over the years?
There are two different problems to be solved:
Firstly, getting the technology to be safe is a fundamental problem.
The secondary problem is the customer belief and options. We have to build the product that customers want to use and feel safe. The autonomous vehicles will be slower and more conservative. People may be scared of technology and robotics, but oppositely may want it to be a more aggressive driver. So the idea of consumer trust and adoption is really difficult and company spends a lot of time meeting with people explaining how the system works. Building additional product features that enables trust and resemblance of control, such as providing options for example, support agents, which people can call from the vehicle so that they are not completely isolated from the system is needed.

3. How often do you travel to the Kendall Square/MIT area?
Was there every day previously while studying at MIT in the LGO program. Now once every or two weeks. Often go through the area to get to other places, not necessarily ending up at Kendall specifically.

4. What do you do in the Kendall Square/MIT area when you are there?
Typically go past it for climbing gym in Summerville or tend to bike everywhere. Also attending MIT or Technology-affiliated events, meetup company events, conferences at MIT, restaurants, bars, and Kendall movie theatres.

5. What method of transportation do you use to get around the Kendall Square/MIT area?
Use Lyft when with others, otherwise bike.

6. In your opinion, what works well with transportation in the Kendall Square/MIT area?
Believe Red line works really well to get people in and out of the Kendall square. Personally, a huge advocate of biking and micro-mobility (skateboards, scooters) as they are much more efficient and healthier. Didn't use MIT bus system, but obviously provides good service within campus and for specific areas. Don't drive to Kendall often, not great parking options.

7. In your opinion, what doesn't work well with transportation in the Kendall Square/MIT area?
Want more protective bike lanes, specifically putting divided barriers between cars and bikes will add a huge degree of safety. For us, autonomous vehicles, it's really important to define the pickup and drop off areas. As a Uber or Lyft driver you can kind of pull over wherever you want although not legal, but autonomous cars need specific areas, ideally off the roads. As a city, it needs to build that infrastructure.

8. In your opinion, how could Aptiv improve day-to-day transportation needs in the Kendall Square/MIT area?

Boston is currently not a primary market for us, so we don't have plans to deploy commercially in Boston. But when I think about autonomous vehicles in the area, it can be more about how to get people from areas that are underserved from the public transportation.

When you look at the network of MBTA, there are areas in between where don't have the service. The autonomous vehicle can start to bring those population to and away from the efficient transportation like red line.

Cost (price): believe that autonomous vehicles will be cheaper than the human-driven vehicles. When you look at the fare structure of Uber or Lyft, the driver collects about 75% of the fee, and the platform provider takes about 25%. We think that for what driver does for 75%, we can do that at a lower number, then the price for end users will come down. Safer and cheaper is business model and offering when we look in an economic lens. Overtime, will recover the R&D costs.

Convenience (time accuracy): It will be slower and more conservative. In the early phase, we can deploy without being capable of doing everything; not operating at night, bad weathers, and self & human-driving options. Slowly increase that number over time as capabilities build and deploy driving service through ride hailing network (uber & lyft).

Sustainability: Not focusing as much on environmental features as of yet. As a company we believe electric vehicles are part of solution, for environmental benefits. We focus on developing technology as we are still a bit away from building technology. Some cities regulatory wise will require electric vehicles for autonomous vehicles.

9. How quickly would an Aptiv solution for the Kendall Square/MIT area become emissions-free?
We think being emission-free is important. But, at this phase of testing autonomous driving, we think of the vehicle as interchangeable platform; electric, combustion, or hybrid. But when we start to produce a huge fleet of vehicles, the electric vehicle is a part of the solution for the environmental benefit.

10. What kinds of infrastructure would need to be put in place for Aptiv's solution?
Pickups and drop offs are necessary. And the charging infrastructure is important. We need areas for cleaning and maintaining the vehicles. At this point, we don't know how many or where to have those infrastructures. These will also come with the cost of lands for depositing vehicles.

11. What advantages does your autonomous solution offer over non-autonomous or other solutions?
The advantage is mostly the safety and cost. Cost is very direct. Safety has a lot of secondary impacts. Less car accidents means less insurance, less hospital visits, etc.
One of not so great, sort of positive thing is, the organ transplants. A lot of organ transplants are from people who got injured or killed in the car accidents. If you take away car accidents, all of sudden you can't get an organ transplant. Like this, there are unintended secondary effects.

12. What would be the life expectancy of the system you would implement?
Not sure yet, but less than a current vehicle. because it will be much more highly utilized. A personally owned vehicle sits for 95% of the time. If we use robo taxi for 18-20 hours a day, the life span will be much shorter, but the number of miles driven will be much higher.

13. What other technology partners would need to be involved to implement your solution?

We need basic road maintenance; the road has to be in certain conditions. We also need connectivity to the vehicles. So we need partners in these areas. Some optimization problems exist of land cost in city and distance for storage of vehicles.

14. What are the human skillsets needed to support this system longer term?
For the development of technology, it needs a very specific skillsets; research scientist, software engineers, cybersecurity.
Once the cars are deployed, we need high proficiency technicians who are capable of working with high tech systems. Not just standard auto repairmen, but someone who are more of technicians who knows how to work with computers and special sensors, replace and calibrate new sensors while also using basic vehicle maintenance like change tires, towing services for vehicles disabled for any reasons, people to clean vehicles.

15. How does your system handle demand growth in the MIT/Kendall Square area? as well as the peaks and lows during the day?
Over time, we can build more cars in the network. Within a specific day, we rebalance and reallocate within the city with the knowledge of where the demand is coming from, based on the data we collect from the users.
We can also assume if we are using electric vehicles, we can balance that based on the demand and have all the cars fully serviced, maintained and charged during periods of downtime and ready with full charge when peak period is hitting. Also have all vehicles online during peaks.

16. What challenges do you see your business possibly running into?
We can category them into technology, regulatory, and societal. In technology, we have to build safe products. In regulatory, we need to abide by all the policies of the states and governments, etc. And we have to work with those agencies to develop a structure that makes sense for businesses. And society, as we need to get the people to accept and want to use the technology.

17. Some people question the actual value of the autonomous driving for the campus/Kendal transportation. With this in mind, could you share your view on the value of autonomous driving in MIT campus/Kendal Square area? What problem can autonomous driving address for this area?
Even though services like Uber, redline, bikes exist, there is a complementary service with the autonomous vehicles. I always have seen it as a complementary to everything else. This is not shifting all the transportation to the autonomous vehicles. This is going to be a multi-model, we are going to have walking, bus, bikes, red lines, and autonomous vehicles.

Supplier Interview Bluebikes

Interviewer: What does transportation look like in Kendall Square today and what does it look like in the future?
Supplier: People interact with transportation differently due to where they live. People who live on one end of the campus and have to bike all the way over to Sloan. I got a lot more into biking during my time at MIT. I think just allowing people to go on their own schedule is difficult with finding transportation. The T does not service much of MIT, you can get there through Sloan (Kendall). Micro-transit helps people in terms of flexibility. Order is necessary. Some of the dockless options, with or without batteries, can cause a lot of trips needed by those servicing the vehicles or moving them around to the right place because one of the things at Bluebikes is looking at all of the movement required (flow of people in the morning as commuters); but then students are different since especially on the Kendall side, it is very much a part of the tech companies that are there. There are a lot of people coming and going.

***Interviewer*:** How does the weather impact the Bluebikes system?
Supplier: Throughout all seasons, MIT students do use the bike system. Bluebikes does not operate through all seasons, with the exception of Cambridge/Boston/Somerville. Cambridge has done what it can You want to make sure reliability is important – that it will be there and that you can check your phone and find out instantly. Company works hard to shift the bikes around to stations that will be utilized the most. Sometimes it is difficult when you put a new station in place, as it takes time for people to think about it and incorporate it in their schedule as an option. You are used to going over here, or the closer of three stations instead of a different one. There are a lot of aspects of human behavior that makes it tough. Weather is a big factor as often you rely on people to redistribute the bikes. Staffing level depends on the weather (seasonally), areas of focus are North Station to Kendall and back. A valet is guaranteed docks (first come first serve), but more bikes at the station than needed. On the transportation side, capacity is important so you can make sure to size it to match demand (to include growth and adoption).

Interviewer: At what interval do you plan staffing and supply?
Supplier: Staffing is planned seasonally, need to have flexibility to bring more staff in as necessary. Two shifts during the day, and enough vans, to cover all hours. In the winter, mostly commuters using the system, but there are spikes when nice weather comes. When Commonwealth Ave and Brighton was shut down for six weeks (2017-2018 summer, work related to the Pike) – Bluebikes adapted to this to help get people to move through this construction area. Trying to provide a service to those who live here and for those who are visitors. Also big events change the plans.

Interviewer: How does the whole [Bluebikes] system with a focus on MIT come into play?
Supplier: There are a number of stations around MIT, the usage data is publicly available. There are many trips in between stations. MIT users are largest percentage of these. You don't want to have too many bikes in one station, so that others have a place to dock. You want to ensure all surrounding areas still have bikes (i.e. Everett). At MIT, it is being mindful of a longer range of hours (patterns of when people are studying, where they live, etc…). Trike with a trailer (can hold 8 bikes) and at very busy times, drivers may be busy moving bikes around. A trike can take a short trip and do repeated trips to redistribute supply. The trike would go in the bike lane.

***Interviewer*:** What was a missed opportunity for Bluebikes while you were there, or what opportunities do you see for Bluebikes in the future?
Supplier: Trying to think of a marathon, and how the bike system would support one. I really wanted to incorporate the bike share stations along the course, and give people an option to use it along the way. Unfortunately, some of the stations are pulled into the street (hurt the flow of marathoning). For MIT, there could be a need for a dockless system -value there, given that you are limited by real estate (where you can place a station). If you have bikes that are required to lock to something (out of open areas). This idea could help solve some problems (perhaps be able to lock and unlock the bike from your phone).

Interviewer: How does Bluebikes fit in with the larger transportation system?
Supplier: A large proportion of people who own bikes have a Bluebikes membership. Bluebikes and personal bike usage is complementary, as long as the price point is right. The busses are okay, not fast, not on your schedule (dictated, can be late), lots of infrastructure needed to provide more options by busses or subway. Micro-transit is better in this regard.

Interviewer: What is micro-transit?
Supplier: Small, single person vehicles. Bikes, scooters, one wheels, etc…

Interviewer: You touched on the right price, what goes into pricing? What are some of the things to keep in mind? Who is funding?
Supplier: Depends on what your costs are, if there a lot of upfront capital costs. The system here started with lots of federal funding, and grants also can be obtained. In some pockets (i.e. Watertown), when you have a big developer come in due to construction disruption, they are held responsible to help mitigate it. You want to keep in mind all of your users, who you are trying to serve. Not just one age range or demographic. You want people to be able to get to work at all hours of the day, and serve those outside of Kendall square. You want a range of options considering how often people may use Bluebikes. How many months of the year are students here? Sometimes annual plans don't make sense, given that they aren't here the whole year. Thinking through all of the different people you are trying to attract. Visitors may be willing to spend a bit more, but understanding the different lengths of trips as well. You can buy a pass that are duration based versus distance trips.

Interviewer: Is MIT responsible for providing more station funding?
Supplier: The municipalities work with MIT, MIT has funded many stations. You can see on each station who may have sponsored help bring the station live. Blue Cross came in with major expansion in mind, they had a target # of new stations for significant growth. Initially there was government funding, but then each of the municipalities were responsible for more expansion, then lastly Blue Cross came in and helped fund massive expansion (thus changing name to Bluebikes). With station siting, if it is on public property – it is usually fine given that it doesn't block utilities (ex: 20 bikes occupy the place of 2 cars). If it is on private property (often off street stations), there are easements/agreements with property owners. There are certainly business who have not fully embraced bikes.

***Interviewer*:** What are the legal things to watch out for?
Supplier: The condition and maintenance of the bikes, in some cases there are agreements with the city. We need to make sure there is a certain amount of maintenance and regular checks on bikes. Preventative maintenance is important. It is important to know if someone has been in an accident, or if someone has stolen the bike (Charles River, Canada, etc…). You want to make sure there is enough

financial benefit for someone to use the bike (if they lose the bike, there is a huge fee – i.e. if they don't lock it properly). Bluebikes was acting as representatives of the city.

Interviewer: Why does Bluebikes work for the city?
Supplier: There are different agreements in different regions. In New York, it is private and Lyft runs the program. Here, it is what the cities wanted -they wanted to provide a service and it is important that it's seen as a public service. Cities wanted control over where stations were placed, whereas private company may only seek a bottom line and place stations in profitable places. It can get confusing because the average user doesn't know the owner is different from the operator who is different from the sponsor. Some challenges going through the city, as you would have to go through the owners every time for a change. When sponsor was brought in, they gave more flexibility to the operator. Owner is the cities, Sponsor is Blue Cross, contractor is now Lyft, used to be Motivate international. Same as Chicago, D.C., Columbus Ohio, San Francisco. There is an obligation for performance, to the cities, but is less flexible in the result.

Interviewer: What is the relationship between the parties (owner/sponsor/operator)?
Supplier: Ultimately lots of agreements put in place to provide clarity. If you are making a huge investment into the system, you want everyone to know that you are part of it (thus Bluebikes). From the outside, the system looks like it is private. Contract-wise, Motivate had a contract with each municipality. Then MAPC (Metro Area Planning Council), the organizing body that brought the four cities and helped facilitate the process – there is one RFP request for proposal for all cities (2011/12). One scope that had consistency for all four, together.

Interviewer: How often did you review the contracts, revisit them?
Supplier: They were renewed every four or five years, sometimes with option to extend (the operator). Motivate had the idea to bring in a sponsor to help facilitate growth and expansion.

Interviewer: Who are the main competitors to Bluebikes if any?
Supplier: It changes over time given how new this industry of micro-transit is. For station based, there wasn't really another competitor. There are two companies with station-based bike share (PBSC – Montreal, may have been the first). Competition considerations were largely with respect to dockless options. When dockless came in, they did not have the right to operate. OFO (Chinese Company, bright yellow bikes) was the largest at the time – would try to flood the market without city approval, many got kicked out of business. MAPC had an RFP for no-cost bike share around the 16 communities around Boston (Arlington, Watertown, etc…). There are many different types of bike share bikes, prior to scooters entering the market. There are Lyme bikes, Ant bikes, etc…

MIT Police

Interviewee's Career

MPR started his police career with the Boston Housing Police and worked in a cruiser supporting housing developments in the city where there were a lot of drugs, guns, and domestic violence. He stated, "You didn't know where you are going every night."

After working for the Boston Housing Police, MPR began working at Boston College where he stayed for about nine years. A friend of MPR got a job at MIT and recommended that he interview at MIT. MPR took the advice and got a job with the MIT Police Department where he worked in crime prevention for about a year. MPR is now in his 18th year at MIT.

Boston Marathon Bombing

The Boston Marathon Bombing had a significant impact on the MIT Police Department and on MPR personally. An MIT Police Department officer was murdered three days after the bombing. MPR stated, "It was like losing a member of your own family" and "it's crazy the effect these things have on a police officer." The bombings changed a lot of people in law enforcement. Half of the department has left since the bombing. "A lot of people didn't want to do the job anymore," stated MPR. A lot of people retired. Out of 60 people, 30 are new since 2013, meaning that "many people never knew" the slain officer.

MIT Police Department Structure

The MIT Police Department has a Chief, a Deputy Chief, as well as an Administrative Captain and Operations Captain. The Admin Captain oversees police training, education, and crime prevention. The Operations Captain handles undercover operations and police patrol. MPR works under the Administrative Captain.

The full force contains forty-two officers over three shifts with thirteen Sergeants and no Lieutenants. The shift strengths are fourteen, thirteen, and thirteen. One officer works Monday through Friday in the detail office. In addition to patrol units and specialized units, officers are tasked daily to perform details (short term projects assisting other stakeholders such as construction sites). There is also one detective assigned to the regional Joint Terrorism Task Force (JTTF), who deals mostly with information sharing and terrorism issues.

***Interviewee*'s Role and Responsibility**

A majority of MPR's work time is spent on articles that fall under the Clery Act. Jean Clery was a student who was raped and murdered in 1985. The Clery Act requires that crimes that meet a certain criterion be reported and made available to students. A formal report must be submitted annually. MPR constantly gets anonymous reports that he must investigate. MPR also gives crime prevention lectures. MPR described one recent report, which was anonymously submitted. MPR said there was no leads to follow, but that filing the report "helps the victim cope with the event."

Police Information Sharing and Collaboration

There are quite a few tips regarding the theft of intellectual property on campus. There is an artificial intelligence lab on campus and an organization called BRIC (Boston Regional Intelligence Center) that sends out intelligence briefings weekly for continual information sharing.

At the university level, there is an organization called B.A.S.I.N. Members from all universities get together and give a presentation that contains descriptions of crimes. Every university gives a presentation. This process has allowed the police to connect the dots of perpetrators across various universities. This has great collaboration and has been successful at closing the distance on many investigations. MPR described that he was assigned to give a presentation early in his career and thought it would be a "waste of time," but after attending said that the information shared has helped some a bunch of crimes.

III. Overview of Ways MIT Police Interacts with Transportation

The MIT Police Department only enforces parking; however, they are a key stakeholder in transportation management around campus. The MIT Police Department is responsible for making sure that there is enough room for resources (transportation assets of all types, including emergency vehicles and responders) to get in and out of Cambridge safely and in a timely manner. MIT primarily relies on the shuttle service. Shuttle buses run at different times for twenty-two hours of each day.

Over the last three years, bike travel has become prevalent and has become a huge topic. There has been a push to encourage people to not bring vehicles into Cambridge. To accommodate, the city shut down one lane of travel on Mass Ave and turned it into a bike lane. Very soon Hub Bikes and Blue Bikes became popular. Bike theft has now become a problem. Larceny is the most common crime on a campus (described as a "crime of opportunity"). When a bike is stolen, the victim a lot of the time will steal someone else's bike. In general, the problem of bikes lying around creates lots of congestion. MPR stated, there are bikes "lying around everywhere," which impacts people's ability to move freely and, in the event of an emergency, the speed with which emergency responders can enter and exit an area. MPR also said there are "scooters everywhere" also. MPR stated homeless people were using the bikes and piling them up around campus, particularly in the MIT track area. MPR talked about "ghost bikes" which are bicycles that are placed at the location of a bike related traffic fatality, similar to the roadside displays for people who have died in an automobile accident. This creates even more roadside and sidewalk congestion on campus.

The general topic of congestion was discussed. MPR stated that MIT's campus hosts 25,000 people on a daily basis, including employees, students, visitors, and other tourists. The general problem of congestion, including bikes and scooters lying around, creates an issue for handicap people being able to easily move through campus. In addition to the problem of congestion, many of the people riding bicycles are "novices" and can be dangerous to themselves or others, particularly when interacting with automobiles. MPR described that people have been "dragged by semi-trucks" because they do not understand the turn radius of those vehicles or the lines of sight on the cars ("they don't pay attention to the mirrors to see if the driver can see them."). Ride sharing platforms (MPR only mentioned "Uber") are a huge problem as the Uber application send people directly to the construction zones as the default for MIT's location. Uber also generally adds to congestion campus.

Cambridge has so much construction that you will see not only MIT police but also other police agencies. Police from all over are working the construction sites. MIT Police Department prioritizes the details. Cambridge police will call in the morning and mention a change in street usage. Kendal Square is typically the priority. Anything with four officers must have a supervisor (Sergeant). Supervisors are also leveraged to support breaks for the details. This has a big impact on traffic. There was a construction worker that was killed last Spring because of a construction accident. Now when the crane is used, traffic is stopped resulting in a back-up of vehicles.

IV. Difference Between Steady State and Emergency Operations

Steady State
Steady state operations are the day to day operations necessary for the MIT PD to maintain its influence on the school. These operations require persistent lookouts according to MPR. Pedestrian traffic lasts about ten minutes to an hour from eight in the morning to three in the afternoon. MPR mentioned, "We have been fortunate that we have not lost more people at cross walks." It is not possible to predict traffic patterns because the evergreen construction will cause the detours to change. MPR mentioned scooters and bike peak hours from 7 – 9:30 a.m. and 4 to 7 p.m., pedestrians from 8 a.m. to 3 p.m., and cars during rush hour.

Emergency
Emergency operations are quite different. The police can add resources easily. MIT Police Department will call the fire department and the Cambridge traffic unit to help make room for traffic. If an emergency happens (such as a heart attack), MIT police will do the best they can and will direct traffic. If a mass casualty incident was to occur, a command post would be setup along with a perimeter. The police would have to free up the street around the incident; open streets for the green zone (where officers could safely stage operations); and make sure that ambulances have street access. Big emergency events, such as mass casualty, are a big concern from a logistics standpoint.
The MIT Police Department has the luxury of being able to directly work with the shuttle service. The MIT Police Department can reroute shuttles when they need to for emergencies. There is no need to call multiple departments to convince decision makers to allow for shuttle rerouting; it can all be handled with one phone call.

It is estimated that the MIT Police Department can get a person to a trauma center within four minutes, which is before the onset of brain damage in an emergency. They can get a person to a trauma center within two minutes with a police escort. This quick turnaround increases the percentage for survival to 90% for a victim, which is truly remarkable.

V. Pain Points for Steady State Operations
MPR provided us a list of transportation types (and events) ranked by the amount of nuisance that the transportation type induces on the campus and police:

1. Tour buses
2. Pedestrian
3. Bikes
4. Construction
5. Shuttles

Tour buses come in every day and they are one of the biggest problems. There is no place to put them since they took out the lane on the student side of Mass Ave. Tour busses will try to park on Waverly street. Athletic teams will also result in additional busses being on campus. Tour buses are a constant problem for MIT, especially now that construction is on Ames Street, pushing tour buses to find other areas to park, often illegally. Athletic buses are not as big a problem for MIT, as the opposing teams typically park where assigned.

Construction causes shuttle patterns to change. This is a pain point. There are constant website updates for new bus stops because of constructions. E2 is an example of where street is constantly changing.

MPR explained that cars that observe new detours tend to be a little frustrated. They drive a little faster and that will sometimes lead to accidents. MPR said, “there schedules don’t change but the amount of time they have gets shorter, so they speed.” Garages have been torn down to make space for the new buildings, which has reduced the amount of parking even with the increase in population. MIT has staging areas for different parts of a construction project. This has worked well.

With the advent of Hub Bikes and Blue Bikes, there has been a growing problem around people just dumping bikes everywhere. MPR stated, “people will just leave the bikes on the sidewalk.” In addition, MPR mentioned, “Twenty-five thousand people pass through campus on a weekday. To have bikes and scooters laying on the sidewalks congests the community especially the handicap community that use the sidewalk.” The homeless are picking up the bikes and it appears they have a homeless bike club. The prevalence of bikes and scooters has also led to huge stolen bike problem. People will buy expensive bikes but buy cheap locks that are easy to break and/or cut. In addition, novice bike users sometimes get hit and/or run over by vehicles.

MPR mentioned that Boston duck boats used to pass through MIT before all of the construction. When that construction is over the school has already promised that they return. Planners need to consider both current stresses on the MIT infrastructure and future planned stresses, like the Duck boats.
MIT has a huge problem with Uber. Uber keeps delivering people into the heart of a construction zone. This must be due to the fact that the MIT “pin” on Uber is outdated, but this results in a lot of backed up traffic along with tourists that have no idea what to do.

VI. Concerns for Emergency Operations
There was a shooting last year that resulted in a police chase (emergency operation). The chase went through campus and then over the bridge where they were the perpetrators were detained by police. There was gridlock traffic while the chase was ongoing, and officers were stuck in traffic and could not support the chase.

VII. Thoughts for Future Transportation Modes
MPR was asked about his perspectives on future state of transportation at MIT. One thought that was brought up was autonomous vehicles. MPR’s initial reactions were of hesitance. He mentioned that the Chief would say that the project would need to be mindful of pedestrians.
In addition, MPR brought up ideas around non-gasoline-based vehicles. Shuttle buses have an opportunity to be convert to low carbon technology. This is due to the low speeds they travel at. There is also an opportunity to add charging stations to the bus lot on Simmons, which would not add to congestion problems.

VIII. Summary
Transportation pains can be summarized into the following categories: pedestrian, bike/scooters, vehicle, shuttles/busses, and construction. Construction causes shuttle patterns to change. Tour buses are the largest pain point. MIT is an open campus and there are tour groups daily. Tourism will only increase after the various construction projects that are underway in Cambridge. Cambridge is trending toward more people and an increase in transportation requirements, but less places to park along with streets getting reduced. Big emergency events, such as mass casualty scenarios, are a big concern from a logistics standpoint.

The MIT Police Department does not know what is going to happen on a given day. There could be an explosion in a lab, fatality, etc. The fact that the MIT Police Department can work with the shuttle

service directly allows for quick traffic changes to support emergency situations. It is estimated that the MIT Police Department can get a person to a trauma center within four minutes, which is before the onset of brain damage in an emergency. They can get a person to a trauma center within two minutes with a police escort. This quick turnaround increases the percentage for survival to 90% for a victim, which is truly remarkable.

A great quote to finish this report is one that MPR mentioned toward the end of the interview, “every day we have to figure a way to do the job, and it’s the guy in the green vest that will be the guy that will help you get to where you need to be in an emergency.” The MIT Police Department is a remarkable organization with amazing personnel such as MPR

MIT Community Interviews

Member 01

Interviewer 1
16:46
Thanks again for agreeing to be interviewed, really what we're trying to do is understand the future of what transportation looks like, you know, at the MIT campus and the Kendall Square area.
As you know, I'm a grad student, and we're working on this opportunity set. I would like to be clear that whatever you say here, we consider confidential, we're not going to share the results with anyone outside of, you know, my team and, and the instructors, it will not be published anywhere. Finally, we will of course not share your individual name or other important information.
However, I do want to thank you again for taking the time to do this.
Just in general, again, do you have any questions or concerns. Before we begin, no, I think that's great.
MIT Community Member
16:47
No, I think that's great. Fire away.
Interviewer 1
16:47
Okay, oh so I mean, when you come into, into Kendall and into Cambridge. I mean, describe your typical day right, what's what, what do you do to get here, what's the process, what's the timeline, etc.
MIT Community Member
16:47:54
Sure, I'm actually you know my commute to MIT has been quite waiting over the years. When I was there as a student, I would usually take, you know, the tea that can go up to Kendall Square from ly to Kendall Square and then from there, I would basically just walk through classes, and that was fine.
Then when you know, after some time my son was here so I had to basically drop him off to the MIT daycare, which is all the way up on the street. I don't know if you've seen this, but it's quite a bit of a walk from there. And, you know, there's always this time delay between the time that the shuttle comes in, and you know you, you're ready for that. So I had to bring my car. So whenever I bring my car.
Another problem initially because I would bring my car. I would drop my son, then I would park all the way on the you know the other side of campus, and then walk for about 25 to 30 minutes if the classes were slow and it's like, almost like 40 minutes, that you're walking. And if it's an in building one for instance and it would be an honor to be a 20 minute walk from there. So, that was typically my day and then leaky after I got hired by it full time. I've basically been parking at an off campus location, just across the street from Kendall.
So, but then my work location is also in 84 so I just parked my car over there and have a about five seven minutes walk from getting to get, you know, to my office.
Interviewer 1

16:49
So interesting you mentioned that right life changes and different stakeholders get involved, no pun intended, but I mean when you interact with the tea, and obviously time is a very important component in anyone's day. Did you ever consider taking your son, on the tea as well? How often did you interact with it, you know, was walking a problem or did you actually really enjoy the 40 minutes of light cardio you get on the season, obviously right to go there?
MIT Community Member
16:50
So, I only took my son a couple of times on the tea and the main reason for that was because you know from Kendall to Vassar it's a it's a quite a long walk for you know like a two year old or three year old, so you know I could potentially bring the stroller but then you know way to like keep the stroller if I leave it over there, especially if it's winter then slept outside and, you know, at the time that of the day that you're coming back home it's a bit of a problem. So, that was actually one of the issues I didn't really take my son too many times on the Tea.
But, other than that, I were, you know, like I think this, The main issue that I find over here is, you know, parking, like in terms of parking around Kendall Square, getting to classes, initially and then even though actually I think, you know, like for instance MIT when they assigned a parking spot, it's usually. I guess it's called Westgate, right like all the way to words.
So most of the time that's the parking that's open to students or even new research scientists and so on and so forth. But if you're a faculty member, you can get a spot in the Sloan building, which makes it much more convenient.
Interviewer 1
16:51
So then again I mean in that vein, when you consider transportation I mean what do you like about it? What don't you like? What are the pros and cons, depending on your different approaches that you found?
MIT Community Member
16:51
I think the most important thing is timing actually, like I think how long it takes you to get to campus and once you're on campus, how long it takes you to get from point A to point B. So I would be perfectly happy not bringing my car because on the way back. I don't know if you've ever been down been gone up Memorial Drive but it's completely blocked at around between four o'clock to 630-7 o'clock, that road is completely blocked and and it takes you like to do just to drive to three miles, it takes you almost like half an hour, and I used to do that every day and hated every day.
So, I would really like for instance, I would love to take the tea but the tea actually around that time is also very crowded so you know there could be a couple of subways that you would have to miss in order to finally get on a subway and you know you're standing super close to other people, and perhaps you know, pre-Covid that was okay but post-Covid I don't feel like experiencing that at all.
So basically, if I could find for me what is important is time and convenience and, you know, less amount of walking and walking is fine, but you know when the weather is not good that it's it's a it's a problem so and you know, I would like to have that consistency to have like one more definite predictions, which are followed by habit every day, versus having to try different

things every day. And also, the other thing that would be important for me would be to make sure that you like if I'm dependent on somebody else or something else, it should be there when I need it so for instance, you know like, the shuttle actually takes you around the campus but sometimes you have to wait 15 minutes for it sometimes you know it could be 30 minutes sometimes you were just a close to the stopping the king didn't stop.

Interviewer 1

16:53

So the other thing was further complicated and again we're talking about good weather if the weather is not good, you know, with Boston whether that becomes a bit of an issue.

MIT Community Member 16:53

Yeah.

Interviewer 1

16:53

I mean, that makes sense. I guess kind of in that vein you know you mentioned something being there when you want it. I mean, are there gaps that you've seen or if you could, if you could paint a picture of the ideal way of getting somewhere in terms of verb not form but like a verb. What would you say I mean what thing would you add or what would you change?

MIT Community Member

16:54:17

So again I'm actually thinking in terms of having to drop my son at one end of campus and going to the other side of campus to work. In that case, you know, I would love to have you know I would love to use public transport as much as possible. I don't want to bring my car every day and then pay for parking as well. So I would love to take, you know if I could get to say, Kendall Square, and then I could, there were some means of transportation.

So if that was guaranteed to be there every time that I'm about to reach there that thing is already ready to go. I can just get up, get out, from the station and take that ride up to here to drop off my son I don't have to worry about parking at the at the daycare, and then again take either car different guy doesn't matter but once I come out I, it should be available on demand and at that time, I can take that to my office and just forget about it.

That would be perhaps the most convenient in an ideal world, especially during the winter season during summers perhaps you're open to walking and that's that's again a good thing but you know having that flexibility would be good.

But the other problem also that I think needs to be addressed to some extent is that, you know, getting to the train station in the first phase is also an issue because you know you can solve the problem on this side of MIT, but there's also the problem of getting to do the train station from and to wherever you live so that's another thing that has to be talked about.

In conclusion, as an ideal solution both methods of transportation were to be switched up and have the issue addressed, then 100% I would take public transportation over bringing my own car and being stuck in traffic every day.

Interviewer 1

16:56

So if I'm clear then really what matters is you know uniformity, predictability, reliability and timing.

MIT Community Member

16:56
That's right.
Interviewer 1
16:56
Yes, yes. So, I guess kind of in that vein back to the idea of transportation, because you've talked about a few different ways. How would you assess the transport system of systems that is transportation here in the greater MIT area? Basically, on a scale of 1 to 10 what grade would you give the transportation you have just described?
MIT Community Member
16:57
Terrible. Yeah, I think, I would say it's close to two or two or three maximum three. I wouldn't give it any more than that, because I think in addition to the problems described, the roads are super tiny there. Wind is also something I haven't described in detail but it's also a pretty big issue as well.
Additionally, traffic is always bad. You know, even if there's like a little bit of construction going on somewhere just blocks of the entire graphic and I think especially if you go down Memorial Drive.
In general, there is a system problem over there because when people are trying to get on to I-90, for instance, I can get there because you know the traffic signal ahead is not at all working so in turn it's a new problem. So it's not like a new problem.
Interviewer 1
16:58
And so you have this never ending problem, where as you've described if perhaps the design would have been more thought out perhaps a lot of the described issues would be eliminated, but in general that idea is wishful thinking. Si, if I understand your thoughts, you are currently just stuck with taking your car, which as you've described because of traffic, parking, etc is not ideal either.
Given that, what's your perspective on public spaces and sharing right sharing space with other people, versus, I guess what I'm trying to ask is, what's the trade off between privacy slash convenience?
And something that is efficient that might sacrifice, not the convenience, but the privacy aspect right so if I can get somewhere where I need to be but things like it like a, you know, like a Hyperloop, right, but with 20 of my best friends know what I'd rather sit with 20 of my best friends and get from A to B, or C with my son, and there's a bit of variability, what's your thought in terms of trade off there?
MIT Community Member
16:59
I think that's a good question but in my opinion, I think, you know, when you get into work and you're coming back from work or to school for instance, I think that's for me personally, it's more of a spiritual time, in the sense that I want to be alone I don't want to interact with people and you know make conversation at that time.
So from that perspective I would prefer privacy, and thus I would choose taking my car over public transport. But then again, when I look at the cost aspect of it and the inconvenience that

comes with parking, I am not sure I would stick to my decision and would perhaps consider a tradeoff. As long as you know the solution is very good.
That being said, I also want to mention the other big problem around the Kendall Square area is parking. I don't know if you've taken note of that but I have gotten tickets, many times, you know, parking at Kendall Square because that has always been an issue.
And the parking lots on Memorial Drive have been turned into paid parking, back in the day, it was like unpaid parking but you could never find a parking spot over there.
MIT area and the little bit of parking spots that were there right next to building one. They've also been taken off or taken away and been turned into bicycle paths.
So those are two other issues associated with transportation in the area as well, but it's just made the problem worse now because you can, you know, you can't park anywhere close to MIT if you just want to, you know, go for it, you know, to do something quickly or, you know, it's a problem.
Interviewer 1
17:01
So it's funny you mentioned some of the changes that have happened in terms of parking and the fact that what once you know what was once a parking spot is now a bike path or what once was unpaid is now paid. Definitely seems like changes that you want to be able to anticipate right? For instance, I am currently living in the area, not nearly as long as you. However, as a note I see a lot of construction, I see a lot of attempted change. But that being said, what's your vision in terms of what you've experienced versus where you see things going?
MIT Community Member
17:01
Um, so, where I see things going I expect, I think in general I think, there is a transition more towards the shared economy in general, so I think that the the strategy that they have in mind the long term strategy, they have in mind is, is to eliminate as many cars as possible and make it so difficult that you don't bring your car, all together.
That's what I feel is the strategy behind it because, you know, if they give you a parking spot it's all the way on the other end of campus. And if you do decide to bring yours, you know it's expensive, so I feel that there's this big push to reduce as many cars as possible in that area, and so I expect.
Regarding traffic, you know like Memorial Drive, I actually don’t see that changing in any significant way.
So, I would expect to see something more along the lines of a mobility device like even a mobility scooter, or something like that on campus when you can take it from one part of campus to the next. I expect to see more of that and designated pathways to help you to get to different places so perhaps it's going to be changed like that. That's what I can envision.
Interviewer 1
17:03
It's interesting that you mentioned the fact that they're almost making it so difficult to bring your car, essentially there is this chicken and egg of deterrence, by pushing for something but obviously operating within the constraints of a very large infrastructure system where you can

make micro adjustments, but that might not necessarily address the overall problem statement.
MIT Community Member
17:03
Yeah, that is very, very interesting.
Interviewer 1
17:03
I'm just a bit out of left field. But you mentioned the positives regarding privacy in driving your car. On that point, would it matter if you're the one driving? Would you mind if someone else is driving for you, like the difference between an Uber or Shaw driving? How would you rank the discussed options in terms of transportation?
MIT Community Member
17:04
I would rank me being able to drive and park close to where I want to be number one. Number two would be you know somebody else can drive me but be available on demand. Third would be, you know, if I have to, to take some kind of transportation, which is nontraditional, and then get from point A to point B.
But then again, the overall ranking comes down to timing. As timing is the most critical component of all of this discussion, it's super important to see which one would represent the shortest time actually.
So, in addition to time, I would also consider privacy as an important factor, those two components would really be the key metrics. I would also actually add protection against weather, I would not want to be driving a convertible in January.
Interviewer 1
17:04:
Thanks, that is super helpful. Is there anything within our system that exists here today that you would absolutely not change?
MIT Community Member
17:05
Uhm no, not really no, I guess. Thinking more on your questions, perhaps there's another idea which is that if for instance, you know like the red line could have an additional stop on the other side of campus. That actually would be significantly helpful, because the Kendall stop means that regardless of either side of campus, you're going it's a 15-minute walk. Having a middle point would definitely improve your options.
Notwithstanding all the other problems that I just described, about these fringe locations which you can get to. Finally, I would like to say that I don't expect to see things changing. I think a probable solution would be a solution as I' ve seen on other campuses with the discussed scooters. Important to note, that snow shoveling, and removal would have to become a priority so these devices could be used year-round.
Interviewer 1
17:06
Understood, well thank you. I've actually reached the end of all the prefabs. I asked all questions that we had on our template. But before I stop recording, I'm going to turn it over to comment just to see if there's anything specific Carmen might want to bring up.

Interviewer 2
17:07
Thank you very much, this has been really helpful. I just have one last question regarding weather, you discussed it to some extent, but how manageable is it to walk during winter, or even if the scooters were to be implemented?
MIT Community Member
17:08
I don’t really see an issue with that, you end up getting used to the weather.

Member 02

Q: *Interviewer*(s)
A: *Interviewee*

Q: Thanks for being with us. We've basically, as I've alluded to earlier, we're hoping to pick your brain on your thoughts as our stakeholder on future of surface transportation system at MIT, the campus and Kendall Square area so as I've alluded to earlier, we'll record this, but after we're done with it, we'll delete it and it's strictly for assignment purposes. So I'm gonna start recording now so it's recording.

A: Okay, cool.

Q: So, also understanding that you're involved in some leadership position but when you tell us, we would like to hear your personal opinions, not necessarily the organization that you're in charge of.

A: Yeah, and I appreciate that by saying that might be different than if you are looking at mine and mine alone and you don't reflect that opinion on leadership growth.

Q: Yeah, exactly. Sweet. So I just thought about warming up. Do you want to tell us a little bit about yourself, your background?

A: Sure. I'm originally from Singapore, I've lived in the greater Boston area for them. Ooh boy, probably 10 years. Yep 10 Going into 11 years now. And since 2013 in the Cambridge area specifically Kendall Square. So then at MIT for pretty much almost the entire time with that birth as a part time commuter student and then only recently as a full time student living in scenery.

Q: Awesome. Okay, so you're pretty well aware of the transportation methods and stuff like that, so speaking of which, what does your typical day look like on campus?

A: Pretty much going back and forth in front of meetings, classes and workshop recitation. Yeah. Typical pretty typical life for graduate students. I usually only managed to find time to make it off campus on the weekends. Want to know on the weekdays, but usually on the weekends.

Q: Gotcha. And how do you usually get up get around the campus

A: walking but I recently started considering getting one of those scooters. But you know I had friends who had been before and didn't seem too happy scootering around into the middle of winter. So, implemented by Boston's pretty much winter for most of the year, still debating whether you're going to go do that.

Q: Gotcha. So I'm assuming that you are interested to know about the Surface Transportation at MIT, whether it's something that exists now or something that would be there in the future, that's something that's of interest to you.

A: Yeah, in the past, I have taken the campus further before but up to COVID and given that my classes are in more or less the same area this semester, I haven't had the need to take the shuttle.

Q: Okay, so do you own any like bike car or motorcycle and you have any preference as to using them, obviously, other than walking around,

A: around the bicycle many kinds of bicycle many years ago but that was around the time when there were a lot of regular accidents involving crashing into a few cyclists, so sort of stop cycling and just took the extra time to walk wherever needed and, quite frankly, I think the amount of time it takes to like find somewhere to like, securing a bike and to get on your bike and making sure your bike is through there when you come back, and the flexibility to the inflexibility of having to go look for your bike after every time that you finish somewhere rather than just being able to walk off with sort of I think outweighs, some of the time savings you get by biking around.

Q: The next question we have for you is, are you currently aware of different options for Surface Transportation at MIT.

A: Yeah, I mean, apart from walking, there is the campus shuttle. The shuttle for the tech square area. Bicycles. Blue bikes. I have a car, and I drive when it gets off-campus into the city proper or wherever. Yeah, the Cambridge bus is, but it doesn't always go wherever I need to go, so I don't ever take that.

Q: And what's your impression now? Do you think they're all working equally well or some of them are not as good as others?

A: Like the Cambridge bus, the bus that goes through Cambridge isn't necessarily the most convenient for me but socially because the prosthetic goes through the route I would take. Yeah. Sorry, what was the question?

Q: So basically, the question I had for you was about performance or convenience. What would be your preference? If you were to go to the options that you eluded to

A: Walk. If I need to get across the west side of the campus, take the T, and drive for anything off-campus.

Q: So, the next question we have for you is, if you want to improve one or many things about the transportation system at MIT, what would that be?

A: I don't think this is so much of an MIT issue. You know I say this as a driver myself, but there are many things that drivers in the area do not abide by, like no right turn in red. It's nearly a daily process with a 50% chance of getting run over by a car. I was crossing a red light right by the Starbucks, and there would be a car running that could almost hit me. Almost hit me pretty much a daily occurrence for nearly a whole year.

Q: The next question for you is whether somebody is designing or conceptualizing a new surface transportation system in and around MIT. What do you think they should put their baseline or weight on? Should it be convenience, safety, automation, or sustainability? Any thoughts on where they should focus on?

A: Convenience is the highest factor because the particular mode of transportation is not convenient. Unless you're particularly overriding factors like safety because you know, either you live far or like in an area. Still, in general, I think convenience would be number one, followed by safety number two. I have quite a few friends working in research labs who stay pretty late at night and put me off safety's number one, and they would prefer a safer option than just walking home at night.

Q: Let me add a quick comment here since you mentioned convenience. So do you have any measure in your mind as you know, you can wait for at most five minutes or something like, what would make the change for you to decide to use service transportation instead of walking by yourself or driving by yourself?

A: I think I would use transportation for most things in the area, probably waiting no more than one to two minutes. I walk fast. Like, I just saw you like 10 minutes ago, and I just ran across campus because I do walk pretty fast, so anything that takes more than a few minutes, it's quicker for me to walk.

Q: Okay, what if it's late?

A: Hardly more than five minutes that way.

Q: Do you usually carry anything? Including your backpack, etc. when you are moving across campus? And does that put a lot of pressure on the timings when you have to be somewhere? Obviously, given the weather conditions, any obstacles you face in that regard?

A: Not generally. I carry a pretty light backpack. In the past I used to carry a full size laptop, plus extra things that I don't necessarily need. This year, going from part time to full time student, I'm now carrying a small convertible tablet instead. When I use any heavy computing power, I just connect to my computer at home from my tablet, which is a nice setup to use computing resources. Thus, the majority of the weight savings I got was just from a full size laptop to a tablet. And once in a while, I carried stuff, for example today, to the SDM office I had to carry a box of T-shirts for the Design Challenge winners, moving it from my apartment. Once in a while I need to carry bigger things like for example I've got a class where I have to build stuff, and I'm building a furniture table that I've no idea how I'm gonna carry back to my apartment tomorrow. So that's gonna be interesting. I'm trying to figure that one out. But yeah, in general not really much stuff to carry around.

Q: Okay, awesome. So, I know you have a keen interest in AI and machine learning, what do you think is the desirability of automation? Is it nice-to-have or even must-have when it comes to automation and Surface Transportation at MIT?

A: [I need] personalized transportation that gets me from point A to point B, without needing to think about it.

I'm not a big fan of the idea of having an automated bus. Cool idea doesn't actually solve the existing problem.

Q: Next question, are you aware of the region's growth strategy, i.e. promoting Kendall Square as the new entrance of MIT? Would you be supportive of that vision as a stakeholder, or somebody who will use public transportation everyday? How do you see strategy goes in line with transportation?

A: As long as we don't turn into Harvard Square, I'm okay. One of the things that really turned me against Harvard Square is that there are just way too many tourists around. It's not the best feeling. It doesn't feel like you're on a campus; it feels like you're in a historic attraction. With regards to transportation, the new tourist visitor center is next to Kendall T station. I guess it's nice for tourists to get off and go straight to the visitor center. But that's also in the middle of where I would normally walk across campus, from engineering to Sloan and back to engineering, and I'm dreading a post-COVID world when it's going to be heavily trafficked.

Q: In terms of weather, obviously we have long winters and very cold ones here. Do you think there would be any consideration or insight that you would like to share with us, when one is to design or conceptualize a transportation system?

A: Yeah, I think most people don't realize how cold it gets when it's below freezing, and you're on a personal transportation device, whether it be a scooter or bike. I see a lot of people get bikes and scooters, and then don't use them for eight months a year.

Q: How about things like shuttle busses, would those be favored over previously mentioned modes of transportation?

A: Yeah, hopefully, that shuttle buses are a lot more comfortable during winter time.

Q: What about cost? Do you think people will be willing to pay more for convenience?

A: It depends; one time cost of buying a bike may be worth it if you ride it everyday. It would be a balance between how much you pay and how much you use.

Q: Gotcha. I'll add one comment here. How much does transportation impact one's choice on where to live?

A: Yeah, for me, the commute was five minutes of the day. My thought process was that I found it worth it to pay more for convenience. I used to commute for 1.5 hours each way during my internship. I found that I can only listen to so many podcasts and audiobooks and the time saved would be worth paying for.

Q: Is there anything else you'd like to add, or share on future surface transportation?

A: Perhaps more consideration to the safety of pedestrians is important. I think this is an important topic especially around Kendall square as the area sees heavy traffic at times.

MIT Student, Senior – living on campus for four years

1. How happy are you with on-campus transportation (Bus, EZRide Shuttle, T, Walk, Bike, Scooter, Cars, etc.)?
    a. ***Bus*** *- bus is great, somewhat reliable, easy access to stops around campus (less than 5 min walk from her dorm), cheaper than train, "They stop too early and then you just have Uber/Lyft" (at around 1am there is no more service). Will use when the MIT shuttle has no routes towards destination, when getting to T is harder. Bus goes all the way down to Harvard.*
    b. ***Shuttle*** *- lots of frats on Boston side, used for events, can track on MIT app, bus is more frequent, free, if i need to go to Newberry I use the bus, shuttle can go offline on the MIT app sometimes so you don't know where it is. Route is weird around campus, which makes people bike more when traveling across campus. During the winter, most people rely on the shuttle to get around campus.*
    c. ***Bike*** *- $3.xx for 30min, one right where the bus stops, most dorms on dorms row by the river, close to most of the dorms, "Almost everyone I know bikes" A lot of people get the annual pass. only bike on nice days. Blue bike student membership.*
    d. ***Train*** *- "a little iffy", feels like a hike to get to Kendall, when it's cold better to go to Kendall than Central, generally safer to go through the buildings than go to Central, 15 min walk from dorms, discouraging to use train because it's a long walk to get there, trains are probably the worst in terms of convenience, more expensive than buses. There are no machines in Kendall to recharge Charlie card, so if you do not have money in it, you will need cash or would not be able to access. "An app would be nice (to recharge)".*
    e. ***Scooter*** *- more expensive than other options, would prefer walking or biking*
    f. ***Rental car/Zip car*** *- Used for: doing fun stuff with friends within city, Going out of campus / city, further than riding a bus (i.e. hiking), When multiple stops are necessary (i.e. doing errands, stops with multiple people)*
    g. ***Uber*** *- Overall, very good. Except on specific times of the pandemic when there were too few and prices / waiting times skyrocketed. Ideal when shopping, after bus stops running, going somewhere where routes (train / bus) are not convenient*
    h. ***SafeRide*** *- will pick you up, can take a while to get to you, but it's an option, runs later.*
    i. *General comments:*
        i. *People generally bike or use a shuttle on campus if they're using transportation. Knowing ETA of transportation is important, tracking is mostly used for the shuttle.*
        ii. *People don't use cash very often.*
        iii. *Cost ranking (cheapest to most expensive): Shuttle, Bus, Train, Bike*

2. Describe how you currently use on-campus transportation (Bus, EZRide Shuttle, T, Walk, Bike, Scooter, Cars, etc.)?
    a. What do you use it for? How often? What works well?
        i. *I always walk to class, walk across the bridge (unless it's cold), take a bus for errands (more than shuttle), Uber if carrying groceries, bus to Harvard or parties. For transportation to further away from campus, rental cars. Friends rent a car at least 2x a month, to go on hikes, trails, driving out of campus, running a bunch of errands, Zip car is cheaper if you're sharing with others (for a few hours $10/person). Only bike on nice days.*
    b. What do you struggle with?
        i. *Have to get a Zip car to go to Chick-fil-A (takes too long to get public transportation*
    c. Any suggestions on improvements with current on-campus transportation?
        i. *One of the biggest changes I would make for transportation would be to have a more convenient train station.*

3. Based on your perspective, what percentage of students use on-campus transportation?
    a. MIT is not a big campus, so most people walk, and the percentage is really high.

4. How easy is it to understand and use the on-campus transportation?
    a. Generally yes, Google Maps helps, buses might be a little harder than trains because they don't stop at every stop. Once you do it a few times it's pretty simple.

5. How important is sustainable transportation to you?
    a. I would appreciate it more if it were.

<u>Secondary Questions (if time allows)</u>

6. In your opinion, what are the highlights of Kendall Square?
    a. What services (if any) do you utilize? What should we be sure not to change?
        i. "It's pretty, (gives you a) modern feel" , "With a good amount of food options (not super cheap but varied)", "Doesn't have stuff, Harvard square has more… Stuff doesn't happen at Kendall", it's far away from dorms, Kendall is not the face of MIT… "only connection I have with Kendall and MIT is the name of the (MBTA) stop (Kendall / MIT)", "Location wise, it's great. Activity wise it's not"

7. What are the biggest complaints from people (in general) using the MIT transportation system?

a. *Closes too early, trains and buses stop at 1am, so if you're out you have to Uber or take a bike*

8. Could you describe transportation systems that you've experienced in other universities, cities, or countries that would be useful at MIT?

Proximity (biggest thing), cadence, clean, they have different cars for different people (like a family cart, business class, economy). Scooters are everyone at Texas A&M, and will limit speeds in certain zones.

Member with Visual Disability Co-director for Government and Community Affairs at MIT

1. How happy are you with on-campus transportation (Bus, EZRide Shuttle, T, Walk, Bike, Scooter, Cars, etc.)?
    a. *In general, moderately happy available options: Bus, MIT Tech Shuttle and MBTA T Trains as main ways of transportation to get to / from campus - home. Also walking within and around campus.*
    b. *When it is complicated to reach the desired location using Train or Buses (multiple connections, trip is too long, weather is not good) then Uber / Lyft become an option.*

2. Describe how you currently use on-campus transportation (Bus, EZRide Shuttle, T, Walk, Bike, Scooter, Cars, etc.)?
    - What do you use it for? How often?
    - What works well?
    - What do you struggle with?
    - Any suggestions on improvements with current on-campus transportation?

In detail, there are specific pros and cons with each of them:

a. ***T Train:*** *Using it frequently. The T gets where needed (MIT and home) but reliability is an issue, access to stations is not always easy and walking within platforms sometimes complicated (as in summer, when fans obstruct the way and it is not easy to detect them with a stick). Also, stations are under staffed, it is frequent that nobody is around to provide assistance, if needed. MBTA T Trains have an option for members of the community with disabilities (called The Ride), nevertheless it is not satisfactory, especially because it is hard and time consuming to get a ride: Extremely poorly managed, I can say enough how bad the service is run. Voice announcements work at most stations, but they don't always convey smart enough information to make decisions or volume is not loud enough.*
b. ***Buses:*** *It is convenient in terms of reaching most of the places needed, but is very unreliable in terms of punctuality. It is common for 20-30 min delays to occur: They don't keep their schedule. Also, it is hard to know about these delays, especially if there is a T train - bus connection: At Harvard Square or Alewife nobody is there to tell me when the bus is leaving, no one will tell you that.*
c. ***MIT Tech Shuttle:*** *It is usually punctual and has a route that will get you places within most parts of campus but not everywhere (NE49, NE48 and tech squares 200/400). Communication is not very reliable and no voice announcements are available.*
d. ***EZRide:*** *Works fairly well, but is pretty slow during rush hours.*

e. ***Uber / Lyft:*** *Reliable once you are in the car, but it is hard to communicate with drivers, since not being able to see them when they arrive. The apps are not very well designed to provide voice information or access commands through voice to actually start the conversation with the driver.*

3. Based on your perspective, what percentage of students use on-campus transportation?
    a. *Majority of the community walks or uses some kind of public transportation.*

4. How easy is it to understand and use the on-campus transportation?
    a. *Not very easy for the visually impaired. Information access is limited to apps that work well with the iPhone Screen Reader, but not all of them do or are limited to the extent and quality of information they provide.*

5. How important is sustainable transportation to you?
    a. *For the visually impaired, receiving a service from the transportation system that is at least as good -in terms of reliability, access, safety, punctuality, ease of use- as the service provided to the rest of the population is the main priority.*

<u>Secondary Questions (if time allows)</u>

6. In your opinion, what are the highlights of Kendall Square? What services (if any) do you utilize?
    a. *Restaurants, bars and shopping areas are accessible, but are noisy, upscale and pricey: Not very welcoming to me.*
    b. *Usually attending Kendall Square to due its close proximity, for MIT meetings, professional and personal.*

7. Could you describe transportation systems that you've experienced in other universities, cities, or countries that would be useful at MIT?
    a. *Feedback (not personal experience) from transport systems in Hong Kong and Singapore that provide more information and are highly accessible.*
    b. *Personal experiences in Washington DC and San Francisco were satisfactory.*

Member 03

Interviewer 1 - Welcome, we are going to be conducting an interview with you as a *Interviewee* in a member of the MIT community. We're trying to understand what the future of transportation in the local area looks like around MIT and Kendall Square. What you tell us will be considered confidential, it's only going to be reviewed by our team, and any of the instructors grading us. Do you have any questions for me before we start the conversation?
Interviewee : Nope
Interviewer 1 - Perfect. *Interviewer* 2, do you want to start us off?
Interviewer 2 - Hi *Interviewee*, are you living on campus?

Interviewee - I am living on campus I live in a dorm.

Interviewer 2 - Is it like a graduate dorm or dorm where you can stay with your family?

Interviewee - I'm in a graduate dorm. Most of the *Interviewee*s here probably younger than me.

Interviewer 2 - Which side of the campus is this dorm?

Interviewee - The dorm is on east side of the campus located between MIT Medical building and Charles river

Interviewer 2 - Do you have a car?

Interviewee - Nope

Interviewer 2 - And whats your schedule like?

Interviewee - I normally wake up about seven o'clock. get ready. This semester all my classes start at 9:30am. I'll just walk over the class. It takes only about five minutes. And then I generally stay on campus till like 4 or 5pm studying with my friends, doing class work and then I will come back and kind of do my own thing and eat dinner. I have two classes, one in the morning and one in the afternoon. I buy lunch from the cafeteria of Mass Ave. That's my general
day. I might try to work out in the morning sometimes. I just walk over to the Ziegler center

Interviewer 2 - And when you're studying, are you going to like a library or some common area?
Interviewee - Yeah, so the Navy has a dedicated area assigned to in building 3. So, I'll go set up, study up there with all the Navy people that were taking classes, we have all the same classes. We do all the homework together.
Interviewer 2 - Yeah, that's super helpful. I noticed you said you stay "on campus". So you're like distinguishing between like the area of campus where you do work and study vs other area of campus where you do, living in recreation, right?

Interviewee - Yeah, that's a good way to think about because I generally am on campus all the time.
Interviewer 2 - Do you ever leave like actual campus and go places for anythingf?
Interviewee - I go out to eat sometimes with friends. If I need groceries at all, I'll walk over to store or take the subway to Target in Central Square. or I'll walk to a CambridgeSide mall for shopping.

Interviewer 2 - Cool, alright so it sounds like when you're walking around to your normal day, you're not really in a rush at all. Is that true?

Interviewee - No, I'm never in a rush.
Interviewer 2 - And it also sounds like you only walk.
Interviewee - That's right. When I first moved here I thought I might bike for but then I realized, everything was so close, and when I thought I might use it more for groceries which I tried a few times but, like, carrying groceries on a bike is kind of hard. It's easier just to get like some big tote bags and fill those up and walk back or take the T.
Interviewer 2 - Have you ever thought of using other ways like scooter, motorcycle or car that gives you space to hold stuff?
Interviewee - Not really, because I didn't want to buy anything. And for my safety perspective, I'm not crazy about like using something on two wheels when I'm trying to carry a bunch of stuff, especially in the traffic. There are long bike lanes around here but I'm still nervous about cars not paying attention, I got this extra weight so I'm not as maneuverable as if I was just biking with the backpack or something.

Interviewer 2 - Yeah, so you've identified that safety is a concern for you right especially around transportation entering and exiting the campus.
Interviewee - Kendall square T is 2minutes walk away from me so I'll take that to Central Square if I want to go down there and that kind of alleviates like 20 minute walk. I feel like I need to carry a little more because you know, sitting on the T for a little bit with a bunch of heavy stuff is different than walking a mile and a half with all of that stuff too.
Interviewer 2 - Why not car?
Interviewee - I was worried about parking like I knew I could find parking but I've also I talked to some people that have been here before and said they didn't really use a car that much, and then it just kind of seemed easier with by moving situation if I could just take a u-haul full of stuff and then bring everything here and then not have to worry about packing up the car. Kind of a big deciding factor with that was, I knew I was coming to a small dorm room and they only have
like a bed and a chair
Interviewer 2 - So you have some even larger hauling requirements for entry and exit campus for the school year. Are you living here during the summer?

Interviewee - Yeah, I will because of the Navy client has summer programs that they want us to do.
Interviewer 2 - And then what is your total time duration here for your stay at MIT?
Interviewee - I have to your orders.
Interviewer 2 - You kept your car somewhere else?
Interviewee - Yeah, I kept my car in Newport News, Virginia where my family lives. I am kind of minimalist for two years and then I can travel back there every few weekends to see them.
Interviewer 2 - And how do you travel to see your family?
Interviewee - So I've done both train and flight. Train takes longer obviously than flying but I had a really bad experience flying home. My flight got cancelled and my luggage got missing a few times. I mostly take train.

Interviewer 2 - Yeah to less things can go wrong in series. Okay, so it seems like it's really important for you to to see your family at a regular cadence. All your stuff is there so you don't really need it here. Is there any main difference between when you exit campus and go the airplane route versus exit campus and go the train route?
Mathhew - It's still the T station at Kendeall square. For train route I go to South station where Amtrack is and for air route I take Silve line from South station.
Interviewer 2 - Which is most common entry point do you use ?

Interviewee - Kendall square is the closest I alwasy use. Central is a mile away.
Interviewer 2 - Do you go anywhere if there is not subway route?

Interviewee - Once I had to go to Hanscom to get an officer photograph but a friend offered to drive me. Trying to minimizing needing to go to any place. I got on the medical plan where I don't have to go to a base for medical stuff and I can go locally.
Interviewer 2 - So how did I get to the mall then?

Interviewee - I just walk there. Its just 5mins walk.
Interviewer 2 - Have you experienced MIT in any meaningfully cold situations yet?

Interviewee - Not really. I grew up in Wisconsin. It's cold there. I mean, it's been a while since I've been in that cold but also, I won't have to shovel in the snow I have boots I can wear. I'm not going to be outside that long. I'm not really worried about it.
Interviewer 2 - Cool. So yeah, it seems like when you are outside, whether it's on campus or entering exit campus, you are forced out of more than like a five or 10 minute window of walking, right?
Interviewee - Yeah, correct and I walk a longer way in nice wether and snake through buildings if I needed to if it was really bad.

Interviewer 2 - So, is that, so why don't you do that normally it's just because it's just more turns and more thinking or is it because you love the ambiance of walking outside.
Interviewee - I like walk outside, it's kind of nice to get the fresh air in the morning walk down that down river but it's pretty.

Interviewer 2 - Are you an outdoorsy person.

Interviewee - I would not say so. Okay, I feel like I'm in the middle you know I like being outside enjoying the weather but I don't like go camping or anything, or extended amount of time outside.

Interviewer 2 - And when, and when you're walking Are you usually with someone, are you walking alone?
Interviewee - I'm usually alone. Sometimes I'll kind of like meet up with friends that are walking the same way and talk to them.
Interviewer 2 - So, do you ever go out of your way, walking so you can spend more time with your crew?

Interviewee - Yeah, I do. Sometimes walk all the way to the T stop just because I'm having a good conversation with people, and then they'll get on the train and I'll just turn around and come back to my dorm.
Interviewer 2 - Cool. So you're not time constrained really when you're walking around. You're not too afraid of the cold weather because you grew up in Wisconsin, and you use, you've experienced that before. You have a pretty good social network, you have a lot of common meeting points with your, your Navy friends so that you end up entering and exiting the same general vicinity of the, of the campus. You have close access to the T station, which helps you exit campus whenever you need to. When you do exit campus one of the, You know you considered bikes but doesn't allow you to haul stuff. You don't want it really do a car because I think you mentioned like parking right like I don't even know if there are pockets or their parking spaces next to the target at Central?
Interviewee - I mean street parking but that just seems like a pain.
Interviewer 2 - Yeah, you don't want the pain so much easier and less thinking just jump on the subway and get there. You've got some solutions for hauling stuff. You're not really interested in motorcycles and etc because safety and also that still doesn't solve the doesn't always solve the parking and hassle. You don't really go out far and venture out and do much stuff, beyond your, you know what you need to do because it sounds like a lot of, you know, you have your family elsewhere. So you go spend time with them, right, like, that's your weekend away.
Sarah - I have a couple follow up questions just as a transplant to an area. I've never lived anywhere that had good public transportation. Was there a learning curve at all for using the subway or did you like already kind of know how to navigate a system like that?
Interviewee - My first experience with a good public transportation system is the Metro system in Washington DC. There wasn't learning curve, but getting my Charlie card set up didn't work initially. There was like an old system and a new system. I used the old system that wasn't set up very good but eventually figured out they had a new like building system so I got set up with that.

And then it's also a little different than the washington dc one because here you scan your card and you once you're in the subway system, you don't ever scan it again. You can literally go anywhere without scanning. If you're in Washington DC, you scan, wherever you go in and you scan wherever you go out so they charge based on how far you went, unless you have like a pass for a day or something like 3 day pass with you can get on and off wherever you want. If you are trying to pay exactly quite the same amount, the right amount to go where you want to go seemed a little confusing.
Sarah - Okay. So is it T pretty affordable them? or is it like that one cost like accommodates like how much you would have traveled?

Interviewee - Well, so, the Department of Defense has a programs had on transportation incentive program, where they will pay for that so I got into that program so it's 90 bucks a month but I don't actually pay out of pocket for that
Sarah - And one one more kind of self serving question. Is it easy to get your luggage, you when you're traveling out of town. Like is it a timing where the team is busy, when you're when your train is leaving from South Station or like previously when you were taking the plane, or is it

pretty easy to get everything that you need to for that longer trip on to the T , and then onto the train.
Interviewee - I would say it's about the same. It's easier to ride. The the T has plenty of rooms, even at the busiest time so you could definitely get, you might stand but there's room for luggage and then on Amtrak, depending on the type of seat you get if you get a, there's coach and business class the coaches first come first serve, and they just put your stuff in the overhead and then business is you haven't assigned seat which is nice but you still there's plenty overhead room on trains. You can take like up to four bags on the train for free. I think it's easier than a plane when it comes to luggage and then my Amtrak ride is about 13 hours, so you kind of gotten into a plan ahead for food because they do at a cafe car but they don't have things you like on there. You might want to bring like some sandwiches like I always get subway before going so I have food on the way and I'll bring some snacks
Interviewer 2 - I had another question that came to mind. I was wondering when you're walking to class, or walking to your library, are you usually carrying a book bag if so, how is it like heavy? Do you have lockers at your Navy office? Walk me through some of those.
Interviewee - All right, so I do have a backpack. I did start off this semester using like a binder for my work and stuff. but then I got an iPad so now I do everything on iPad. And then I also have a laptop so I actually take the iPad in my laptop together so I can like have the backup scroll through stuff while writing on the iPad. That's how I kind of organize everything. I only have one textbook. I kind of like to minimize textbooks, because from past school experiences, generally didn't use them. So I'll do everything, with my laptop and my iPad, which aren't too heavy, and then I'll take. I'll take like some manueuvers sometimes for lunch I know I said earlier I buy things to try and they're like on campus so kind of pens. Sometimes I'll leave stuff up in Navy offices. I don't have a locker. I have a cubicle that's mine, but only Navy people can get into those and feel like there's a lot of trust. People leave stuff up there all the time. Some people have like their own big computer set up in their world cubicles.
Interviewer 2 - So you have an area on campus to stage things. If you don't need to carry them in an environment that is effectively a locker because it's effectively locked. And you have some mutual trust and an agreement between your co workers not to screw with each other stuff. Yeah.
Interviewer 2 - So it sounds like when you are walking around and traveling across campus during your normal routines, just because of how you've, you've kind of structured stuff you don't really have a lot to carry it's just your iPad your computer, maybe a book, and then some tactical snacks.
Interviewee - Yeah, that's pretty much what I carry around.
Interviewer 2 - So, something that I love about MIT, is that there's like a little bubble it's like a bubble safety, where you can be nerdy. You can act differently inside the bubble. Now inside the bubble, so I saw like this one guy on the other team. The other day I saw a dude with, what are they called Heely shoes that kids shoes. You also see the, the people on the skateboards. I've discovered that electric skateboards can brake. Anyways, my point is, why don't you wear the heely's shoes and start around
Interviewee - Ah, not really. I don't have amazing balance and dexterity so I would just be asking for disaster personly.
Interviewer 2 - The safety is pretty big for you. And so you walk lot, you don't ride bikes.

Interviewee - Yeah, maintain my body and not hurt myself.
Interviewer 2 - Have you ever considered any type of intra campus transportation beyond walking and decided that's not for me?
Interviewee - Yeah, I've looked at the bus goes right in from my dorm I forget what it's called but it goes around to like grocery stores like every other day or something.

But it just seemed to me at least right now maybe I'll keep my mind in the winter but like I just want the freedom of being able to walk whenever I feel like not worrying about like, when that bus is going to get around or waiting you know 20 minutes for it did come around to the next time so I can get on and go back home where it's like in my time I couldn't just walk.
Interviewer 2 - That is good point right you want your autonomy and you don't want to have to wait on someone else's schedule you want to make you want to move according to your own time. What if, though like you know you could Uber, right, you can just like pull up your phone and some Uber person like intra campus Uber's person picks you up and drops off. Would you consider something like that?
Interviewee - This campus is so small I personally don't really see myself using it that much and less like maybe I was trying to like carry a bunch of stuff. like a big project I was trying to move around or something but I can't really see myself using it that much like just thinking about waiting. I'm going to go through the mental capacity.
Interviewer 2 - You know steps it's extra, extra things to think about when you're already a decision constraint right? You already have decision fatigue just by being here.
Interviewer 2 - So if I handed you a free scooter, an electric free electric scooter, like a $2,000. Nice like bird scooter thing. Would you find it useful?
Interviewee - I would probably use it.
Interviewer 2 - Have you ever done that before it's like a lot of fun?
Interviewee - No, I haven't. I just haven't had an opportunity. I got down in Newport News. They have like those scooter share things but yeah, pretty much anytime I'm out in an environment like that I have my four and six year old with me and I can't really scoot around with them that much. Otherwise I probably would try it.
Interviewer 2 - I highly recommend it. I did it in a couple cities. But you see, like, three times more than you could by walking.

So if we staged a bunch of electric scooters around campus. Like literally we put a bin of scooters outside your door so that as you exit the dorm, they're just sitting there, you pull out your phone you scan a QR code it activates you go, you get billed at some other point we minimize all the decisions that you have to make you might consider scooting around.
Interviewee - Yeah, it seemed kind of fun. Part of the reason I walk around, as I like looking at everything it's just fun to see like what's going on, picking environments. I like seeing like there's construction sites. Look at the little things are changing every day. I like to walk. I just like doing that and on my last ship I was on, I had to walk like three quarters of a mile from the parking lot to the ship every day, and back, because we were in the shipyards and I actually a lot of people complained about it but I liked it because they got me, you know, mile and a half of walking every day and usually I be talking to friends there and back from the ship so I thought it's just a good use of time can now walk past all right, look at all the shipyard stuff.

Interviewer 2 - Cool. So it sounds like if we constructed something like tunnel that would get you half as fast. It wouldn't be as appealing to you just because you like you actually like to see stuff.
Interviewee - Yeah, I think. And when I'm riding on the Amtrak I find myself just staring out the window for a long time, not doing anything and not watching anything because I like seeing all the scenery and going through cities and stuff.
Interviewer 2 - So you like the experience of traveling.
Interviewee - Yeah, I do. My wife gets mad at me it's a bad habit, start stirring up things when I'm driving, I have to focus on the road.
Interviewer 2 - But you have those thoughts while in control of the machine, it'd be a safety hazard there.
Mathew - Right
Interviewer 2 - Let's say we create some type of ability for you to leave your dorm. Minimize the decisions that you have to make. But you can add a glance grab a device called a scooter. For now. At any time. You want to without having to negotiate with anybody on your own terms. A scooter you're okay with.

But what about,like a skateboard sharing program, or a bicycle sharing program intra campus, or those cool little mono bikes. Do you have any thoughts there?
Interviewee - I don't have great balance so the skateboard and mono thing kind of makes me nervous but that doesn't mean I wouldn't be interested in trying it but I don't have great balance. Maybe the bike sharing thing intra campus would be good. I know one of the issues. I know some of my friends have expressed this is like, if you use the blue bikes it seems like the the stations fill up really fast for everybody coming to campus during the day and they can't find a spot to put the bike. And then, and then the opposite at the end of the day, like there might not be any new bikes left.
Interviewer 2 - Have you ever thought about having your own bike?
Interviewee - I have. I wasn't sure how much I would use it and then trying to store it in the winter. My dorm does have like a bicycle storage in the basement, which is kind of hard to get to.
Interviewer 2 - So it's not really convenient for you to store your bike, if you owned it and you're only here for two years so you don't know how much you don't know if the amount of use that you would get out of it over two years with justify the cost.
Interviewer 2 - I bought a $700 bike bike a week before getting here starting school I have not used it once I have not used it once.
Interviewee - Yeah, that's something I was worried about it maybe if I wasn't living on campus I might do a more biking, if I wasn't as close to campus but due to my location I almost can't get any closer to my classes. That makes a big difference on needing anything like that.
Interviewer 2 - Did you make the decision to live on campus based off of commute ability and transportation needs an anticipation of that?
Interviewee - Yes, and as well as financially, because I own a home in Newport News, so I budgeted how much my housing allowance would go up, and it was not enough really to cover a decent apartment here, but it was more than enough. If I could get into this dorm. So that kind of financially also went into it as well.

Interviewer 2 - Yeah, and that's an interesting thing to consider for graduate *Interviewee*s. We usually are older we have families. Many of us have our own mortgages and we're not going to like break that to come to school for two years or so so the transient nature does affect those kinds of decisions.
Interviewee - If my family had moved here, I don't know that was picked a graduate dorm. Even for family I probably would have gotten something different but because that they aren't here and I can live really minimally that just seem to make things a lot easier. I didn't have to take any, you know, kitchen where didn't have to move a bed, move by one chair and move computers and clothes and I brought a coffee maker, which was just really easy to just moving up a house full of couches and stuff I'm sure you know, is a pain
Interviewer 2 - Yeah, that was interesting.
Interviewee - Right. That was something else that went into moving here was because once I decided I was coming here myself I was really nervous trying to figure out, parking and stuff for the moving truck I had like the smallest u-haul and luckily there's a small loading spot I was able to use outside my dorm but I so I didn't invite any comments or anything but I mean if you're not, if you don't know the area, like how to work all that that could be really nerve wracking. Especially with a big truck like he said I think if I had moved my family I would have done the, what a moving company worry about all that and they can move on that was my original strategy
Interviewer 2 - That was my original stretgy but moving company said you have to get your own permit. but then you have to leave at this time on this day so that we can park here, the people who were parking there didn't follow that. So then I was in this awkward situation.
Interviewer 2 - So, I guess, before we jump into the closing questions, considering that the purpose of this interview was to just kind of fully understand your call it serve surface transportation needs through campus and into and out of campus. Do you think that we've missed anything, any equities that you have any, any cares stakeholder needs that you would have?
Interviewee - I can't really think of any other questions. I feel like also my needs are really simple, because it's just me. It would be different if I was here with my family. I could just go into school I'd want to be near a school trying to figure that out. That'd be a whole nother whole nother thing but because it just me that it's a lot simpler.

Interviewer 2 - Yeah, for sure. Does anyone else have any questions that maybe I didn't think of?
Interviewer 1 - You find yourself wanting more. I know you have a pretty short commute walk them back but you ever wish this was more comfortable, more faster, more anything
Interviewee - You talking about for transportation wise,

Interviewer 1 - Just like how you travel in general?

Interviewee - I really liked trains, I just wished there was more subways around to different areas around the Cambridge area, because there's really only the red line.
And I think it's a great way, environmentally to transport people and because it's on its own line. You know dedicate line, you don't have to worry about traffic at all. But other than that, no. Sometimes I find myself walking around and I see these giant lines of cars and I'm like I'm glad
I'm not driving.
Interviewer 2 - You know what I feel like you would love. I went to Disney World this summer. And they obviously have a lot of different you know travel capabilities they've got the monorail they've got cars they got everything, but they introduce a brand new thing, which is, I don't remember what it's called but it's effectively a ski lift.

And it just ski lifts you overall the parks and it's like a subway but imagine you're, you know, 30 feet off the ground. And then they create this big glass bubbles and so you just sit there alone in this peaceful little bubble. And he looked down at all the busy bees buzzing around facilities to have it's kind of like a gondola type system right yeah literally Yeah, that's exactly what it is. You can get on whatever you want, get off whatever you want. There's dedicated stations, and then you just sit on a bench, and like they have like a glass floor so you just like look down at people.
Interviewee - Yeah, I've seen some other countries that have public transportation they use stuff like that. In their cities, I think that would be cool to have.I've been skiing before too so it's kind of fun to ride those
Interviewer 2 - Awesome, thank you so much for spending so much time talking in vivid detail about what some people might consider, you know, just like normal rudimentary stuff but it was very helpful for us to understand our stakeholder their needs and kind of what guides their needs. Does anyone on the team have any thing else to say or a close?
Interviewer 1 - Appreciate it.
Interviewee - Yeah, no problem. If you guys have more questions or want to interview me again or whatever, just let me know.
Interviewer 2 - Appreciate it. Sweet. Bye. Have a good rest of your day y'all. Take care.

Graduate student in the MECH E department Master's degree program

Interviewer 1 - Welcome, we are going to be conducting an interview with you as a *Interviewee* in a member of the MIT community. We're trying to understand what the future of transportation in the local area looks like around MIT and Kendall Square. What you tell us will be considered confidential, it's only going to be reviewed by our team, and any of the instructors grading us. Do you have any questions for me before we start the conversation?

Interviewee : Nope

Interviewer 1 - Perfect. *Interviewer* 2, do you want to start us off?

Interviewer 2 - Hi *Interviewee*, are you living on campus?

Interviewee - I am living on campus I live in a dorm.

Interviewer 2 - Is it like a graduate dorm or dorm where you can stay with your family?

Interviewee - I'm in a graduate dorm. Most of the *Interviewee*s here probably younger than me.

Interviewer 2 - Which side of the campus is this dorm?

Interviewee - The dorm is on east side of the campus located between MIT Medical building and Charles river

Interviewer 2 - Do you have a car?

Interviewee - Nope

Interviewer 2 - And whats your schedule like?

Interviewee - I normally wake up about seven o'clock. get ready. This semester all my classes start at 9:30am. I'll just walk over the class. It takes only about five minutes. And then I generally stay on campus till like 4 or 5pm studying with my friends, doing class work and then I will come back and kind of do my own thing and eat dinner. I have two classes, one in the morning and one in the afternoon. I buy lunch from the cafeteria of Mass Ave. That's my general day. I might try to work out in the morning sometimes. I just walk over to the Ziegler center

Interviewer 2 - And when you're studying, are you going to like a library or some common area?

Interviewee - Yeah, so the Navy has a dedicated area assigned to in building 3. So, I'll go set up, study up there with all the Navy people that were taking classes, we have all the same classes. We do all the homework together.

Interviewer 2 - Yeah, that's super helpful. I noticed you said you stay "on campus". So you're like distinguishing between like the area of campus where you do work and study vs other area of campus where you do, living in recreation, right?

Interviewee - Yeah, that's a good way to think about because I generally am on campus all the time.

Interviewer 2 - Do you ever leave like actual campus and go places for anythingf?

Interviewee - I go out to eat sometimes with friends. If I need groceries at all, I'll walk over to store or take the subway to Target in Central Square. or I'll walk to a CambridgeSide mall for shopping.

Interviewer 2 - Cool, alright so it sounds like when you're walking around to your normal day, you're not really in a rush at all. Is that true?

Interviewee - No, I'm never in a rush.

Interviewer 2 - And it also sounds like you only walk.

Interviewee - That's right. When I first moved here I thought I might bike for but then I realized, everything was so close, and when I thought I might use it more for groceries which I tried a few times but, like, carrying groceries on a bike is kind of hard. It's easier just to get like some big tote bags and fill those up and walk back or take the T.

Interviewer 2 - Have you ever thought of using other ways like scooter, motorcycle or car that gives you space to hold stuff?

Interviewee - Not really, because I didn't want to buy anything. And for my safety perspective, I'm not crazy about like using something on two wheels when I'm trying to carry a bunch of stuff, especially in the traffic. There are long bike lanes around here but I'm still nervous about cars not paying attention, I got this extra weight so I'm not as maneuverable as if I was just biking with the backpack or something.

Interviewer 2 - Yeah, so you've identified that safety is a concern for you right especially around transportation entering and exiting the campus.

Interviewee - Kendall square T is 2minutes walk away from me so I'll take that to Central

Square if I want to go down there and that kind of alleviates like 20 minute walk. I feel like I need to carry a little more because you know, sitting on the T for a little bit with a bunch of heavy stuff is different than walking a mile and a half with all of that stuff too.

Interviewer 2 - Why not car?

Interviewee - I was worried about parking like I knew I could find parking but I've also I talked to some people that have been here before and said they didn't really use a car that much, and then it just kind of seemed easier with by moving situation if I could just take a u-haul full of stuff and then bring everything here and then not have to worry about packing up the car. Kind of a big deciding factor with that was, I knew I was coming to a small dorm room and

they only have like a bed and a chair

Interviewer 2 - So you have some even larger hauling requirements for entry and exit campus for the school year. Are you living here during the summer?

Interviewee - Yeah, I will because of the Navy client has summer programs that they want us to do.

Interviewer 2 - And then what is your total time duration here for your stay at MIT?

Interviewee - I have to your orders.

Interviewer 2 - You kept your car somewhere else?

Interviewee - Yeah, I kept my car in Newport News, Virginia where my family lives. I am kind of minimalist for two years and then I can travel back there every few weekends to see them. *Interviewer* 2 - And how do you travel to see your family?

Interviewee - So I've done both train and flight. Train takes longer obviously than flying but I had a really bad experience flying home. My flight got cancelled and my luggage got missing a few times. I mostly take train.

Interviewer 2 - Yeah to less things can go wrong in series. Okay, so it seems like it's really important for you to to see your family at a regular cadence. All your stuff is there so you don't really need it here. Is there any main difference between when you exit campus and go the airplane route versus exit campus and go the train route?

Interviewee - It's still the T station at Kendeall square. For train route I go to South station where Amtrack is and for air route I take Silve line from South station.

Interviewer 2 - Which is most common entry point do you use ?

Interviewee - Kendall square is the closest I alwasy use. Central is a mile away.

Interviewer 2 - Do you go anywhere if there is not subway route?

Interviewee - Once I had to go to Hanscom to get an officer photograph but a friend offered to drive me. Trying to minimizing needing to go to any place. I got on the medical plan where

I don't have to go to a base for medical stuff and I can go locally.

Interviewer 2 - So how did I get to the mall then?

Interviewee - I just walk there. Its just 5mins walk.

Interviewer 2 - Have you experienced MIT in any meaningfully cold situations yet?

Interviewee - Not really. I grew up in Wisconsin. It's cold there. I mean, it's been a while since I've been in that cold but also, I won't have to shovel in the snow I have boots I can wear. I'm not going to be outside that long. I'm not really worried about it.

Interviewer 2 - Cool. So yeah, it seems like when you are outside, whether it's on campus or entering exit campus, you are forced out of more than like a five or 10 minute window of walking, right?

Interviewee - Yeah, correct and I walk a longer way in nice wether and snake through buildings if I needed to if it was really bad.

Interviewer 2 - So, is that, so why don't you do that normally it's just because it's just more turns and more thinking or is it because you love the ambiance of walking outside.

Interviewee - I like walk outside, it's kind of nice to get the fresh air in the morning walk down that down river but it's pretty.

Interviewer 2 - Are you an outdoorsy person.

Interviewee - I would not say so. Okay, I feel like I'm in the middle you know I like being outside enjoying the weather but I don't like go camping or anything, or extended amount of time outside.

Interviewer 2 - And when, and when you're walking Are you usually with someone, are you walking alone?

Interviewee - I'm usually alone. Sometimes I'll kind of like meet up with friends that are walking the same way and talk to them.

Interviewer 2 - So, do you ever go out of your way, walking so you can spend more time with your crew?

Interviewee - Yeah, I do. Sometimes walk all the way to the T stop just because I'm having a good conversation with people, and then they'll get on the train and I'll just turn around and come back to my dorm.

Interviewer 2 - Cool. So you're not time constrained really when you're walking around. You're not too afraid of the cold weather because you grew up in Wisconsin, and you use, you've experienced that before. You have a pretty good social network, you have a lot of common meeting points with your, your Navy friends so that you end up entering and exiting the same general vicinity of the, of the campus. You have close access to the T station, which helps you exit campus whenever you need to. When you do exit campus one of the, You know you considered bikes but doesn't allow you to haul

stuff. You don't want it really do a car because I think you mentioned like parking right like I don't even know if there are pockets or their parking spaces next to the target at Central?

Interviewee - I mean street parking but that just seems like a pain.

Interviewer 2 - Yeah, you don't want the pain so much easier and less thinking just jump on the subway and get there. You've got some solutions for hauling stuff. You're not really interested in motorcycles and etc because safety and also that still doesn't solve the doesn't always solve the parking and hassle. You don't really go out far and venture out and do much stuff, beyond your, you know what you need to do because it sounds like a lot of, you know, you have your family elsewhere. So you go spend time with them, right, like, that's your weekend away.

Interviewer 2 - I have a couple follow up questions just as a transplant to an area. I've never lived anywhere that had good public transportation. Was there a learning curve at all for using the subway or did you like already kind of know how to navigate a system like that?

Interviewee - My first experience with a good public transportation system is the Metro system in Washington DC. There wasn't learning curve, but getting my Charlie card set up didn't work initially. There was like an old system and a new system. I used the old system that wasn't set up very good but eventually figured out they had a new like building system so I got set up with that.

And then it's also a little different than the washington dc one because here you scan your card and you once you're in the subway system, you don't ever scan it again. You can literally go anywhere without scanning. If you're in Washington DC, you scan, wherever you go in and you scan wherever you go out so they charge based on how far you went, unless you have like a pass for a day or something like 3 day pass with you can get on and off wherever you want. If you are trying to pay exactly quite the same amount, the right amount to go where you want to go seemed a little confusing.

Interviewer 2 - Okay. So is it T pretty affordable them? or is it like that one cost like accommodates like how much you would have traveled?

Interviewee - Well, so, the Department of Defense has a programs had on transportation incentive program, where they will pay for that so I got into that program so it's 90 bucks a

month but I don't actually pay out of pocket for that

Interviewer 2 - And one one more kind of self serving question. Is it easy to get your luggage, you when you're traveling out of town. Like is it a timing where the team is busy, when you're when your train is leaving from South Station or like previously when you were taking the plane, or is it pretty easy to get everything that you need to for that longer trip on to the T , and then onto the train.

Interviewee - I would say it's about the same. It's easier to ride. The the T has plenty of rooms, even at the busiest time so you could definitely get, you might stand but there's room for luggage and then on Amtrak, depending on the type of seat you get if you get a, there's coach and business class the coaches first come first serve, and they just put your stuff in the overhead and then business is you haven't assigned seat which is nice but you still there's plenty overhead room on trains. You can take like up to four bags on the train for free. I think it's easier than a plane when it comes to luggage and then my Amtrak ride is about 13 hours, so you kind of gotten into a plan ahead for food because they do at a cafe car but they don't have things you like on there. You might want to bring like some sandwiches like I always get subway before going so I have food on the way and I'll bring some snacks

Interviewer 2 - I had another question that came to mind. I was wondering when you're walking to class, or walking to your library, are you usually carrying a book bag if so, how is it like heavy? Do you have lockers at your Navy office? Walk me through some of those.

Interviewee - All right, so I do have a backpack. I did start off this semester using like a binder for my work and stuff. but then I got an iPad so now I do everything on iPad. And then I also have a laptop so I actually take the iPad in my laptop together so I can like have the backup scroll through stuff while writing on the iPad. That's how I kind of organize everything. I only have one textbook. I kind of like to minimize textbooks, because from past school experiences, generally didn't use them. So I'll do everything, with my laptop and my iPad, which aren't too heavy, and then I'll take. I'll take like some manueuvers sometimes for lunch I know I said earlier I buy things to try and they're like on campus so kind of pens. Sometimes I'll leave stuff up in Navy offices. I don't have a locker. I have a cubicle that's mine, but only Navy people can get into those and feel like there's a lot of trust. People leave stuff up there all the time. Some people have like their own big computer set up in their world cubicles.

Interviewer 2 - So you have an area on campus to stage things. If you don't need to carry them in an environment that is effectively a locker because it's effectively locked. And you have some mutual trust and an agreement between your co workers not to screw with each other stuff. Yeah.

Interviewer 2 - So it sounds like when you are walking around and traveling across campus during your normal routines, just because of how you've, you've kind of structured stuff you don't really have a lot to carry it's just your iPad your computer, maybe a book, and then some tactical snacks.

Interviewee - Yeah, that's pretty much what I carry around.

Interviewer 2 - So, something that I love about MIT, is that there's like a little bubble it's like a bubble safety, where you can be nerdy. You can act differently inside the bubble. Now inside the bubble, so I saw like this one guy on the other team. The other day I saw a dude with, what are they called Heely shoes that kids shoes. You also see the, the people on the skateboards. I've discovered that electric skateboards can brake. Anyways, my point is, why don't you wear the heely's shoes and start around

Interviewee - Ah, not really. I don't have amazing balance and dexterity so I would just be asking for disaster personly.

Interviewer 2 - The safety is pretty big for you. And so you walk lot, you don't ride bikes.

Interviewee - Yeah, maintain my body and not hurt myself.

Interviewer 2 - Have you ever considered any type of intra campus transportation beyond walking and decided that's not for me?

Interviewee - Yeah, I've looked at the bus goes right in from my dorm I forget what it's called but it goes around to like grocery stores like every other day or something.

But it just seemed to me at least right now maybe I'll keep my mind in the winter but like I just want the freedom of being able to walk whenever I feel like not worrying about like, when that bus is going to get around or waiting you know 20 minutes for it did come around to the next time so I can get on and go back home where it's like in my time I couldn't just walk.

Interviewer 2 - That is good point right you want your autonomy and you don't want to have to wait on someone else's schedule you want to make you want to move according to your own time. What if, though like you know you could Uber, right, you can just like pull up your phone and some Uber person like intra campus Uber's person picks you up and drops off.

Would you consider something like that?

Interviewee - This campus is so small I personally don't really see myself using it that much and less like maybe I was trying to like carry a bunch of stuff. like a big project I was trying to move around or

something but I can't really see myself using it that much like just thinking about waiting. I'm going to go through the mental capacity.

Interviewer 2 - You know steps it's extra, extra things to think about when you're already a decision constraint right? You already have decision fatigue just by being here.

Interviewer 2 - So if I handed you a free scooter, an electric free electric scooter, like a

$2,000. Nice like bird scooter thing. Would you find it useful?

Interviewee - I would probably use it.

Interviewer 2 - Have you ever done that before it's like a lot of fun?

Interviewee - No, I haven't. I just haven't had an opportunity. I got down in Newport News. They have like those scooter share things but yeah, pretty much anytime I'm out in an environment like that I have my four and six year old with me and I can't really scoot around with them that much. Otherwise I probably would try it.

Interviewer 2 - I highly recommend it. I did it in a couple cities. But you see, like, three times more than you could by walking.

So if we staged a bunch of electric scooters around campus. Like literally we put a bin of scooters outside your door so that as you exit the dorm, they're just sitting there, you pull out your phone you scan a QR code it activates you go, you get billed at some other point we minimize all the decisions that you have to make you might consider scooting around.

Interviewee - Yeah, it seemed kind of fun. Part of the reason I walk around, as I like looking at everything it's just fun to see like what's going on, picking environments. I like seeing like there's construction sites. Look at the little things are changing every day. I like to walk. I just like doing that and on my last ship I was on, I had to walk like three quarters of a mile from the parking lot to the ship every day, and back, because we were in the shipyards and I actually a lot of people complained about it but I liked it because they got me, you know, mile and a half of walking every day and usually I be talking to friends there and back from the ship so I thought it's just a good use of time can now walk past all right, look at all the shipyard stuff.

Interviewer 2 - Cool. So it sounds like if we constructed something like tunnel that would get you half as fast. It wouldn't be as appealing to you just because you like you actually like to see stuff.

Interviewee - Yeah, I think. And when I'm riding on the Amtrak I find myself just staring out the window for a long time, not doing anything and not watching anything because I like seeing all the scenery and going through cities and stuff.

Interviewer 2 - So you like the experience of traveling.

Interviewee - Yeah, I do. My wife gets mad at me it's a bad habit, start stirring up things when I'm driving, I have to focus on the road.

Interviewer 2 - But you have those thoughts while in control of the machine, it'd be a safety hazard there.

Interviewee - Right

Interviewer 2 - Let's say we create some type of ability for you to leave your dorm. Minimize the decisions that you have to make. But you can add a glance grab a device called a scooter. For now. At any time. You want to without having to negotiate with anybody on your own terms. A scooter you're okay with.

But what about,like a skateboard sharing program, or a bicycle sharing program intra campus, or those cool little mono bikes. Do you have any thoughts there?

Interviewee - I don't have great balance so the skateboard and mono thing kind of makes me nervous but that doesn't mean I wouldn't be interested in trying it but I don't have great balance. Maybe the bike sharing thing intra campus would be good. I know one of the issues. I know some of my friends have expressed this is like, if you use the blue bikes it seems like the the stations fill up really fast for everybody coming to campus during the day and they can't find a spot to put the bike. And then, and then the opposite at the end of the day, like there might not be any new bikes left.

Interviewer 2 - Have you ever thought about having your own bike?

Interviewee - I have. I wasn't sure how much I would use it and then trying to store it in the winter. My dorm does have like a bicycle storage in the basement, which is kind of hard to get to.

Interviewer 2 - So it's not really convenient for you to store your bike, if you owned it and you're only here for two years so you don't know how much you don't know if the amount of use that you would get out of it over two years with justify the cost.

Interviewer 2 - I bought a $700 bike bike a week before getting here starting school I have not used it once I have not used it once.

Interviewee - Yeah, that's something I was worried about it maybe if I wasn't living on campus I might do a more biking, if I wasn't as close to campus but due to my location I almost can't get any closer to my classes. That makes a big difference on needing anything like that.

Interviewer 2 - Did you make the decision to live on campus based off of commute ability and transportation needs an anticipation of that?

Interviewee - Yes, and as well as financially, because I own a home in Newport News, so I budgeted how much my housing allowance would go up, and it was not enough really to cover a decent apartment here, but it was more than enough. If I could get into this dorm. So that kind of financially also went into it as well.

Interviewer 2 - Yeah, and that's an interesting thing to consider for graduate *Interviewee*s. We usually are older we have families. Many of us have our own mortgages and we're not going to like break that to come to school for two years or so so the transient nature does affect those kinds of decisions.

Interviewee - If my family had moved here, I don't know that was picked a graduate dorm. Even for family I probably would have gotten something different but because that they aren't here and I can live really minimally that just seem to make things a lot easier. I didn't have to take any, you know, kitchen where didn't have to move a bed, move by one chair and move computers and clothes and I brought a coffee maker, which was just really easy to just

moving up a house full of couches and stuff I'm sure you know, is a pain *Interviewer* 2 - Yeah, that was interesting.

Interviewee - Right. That was something else that went into moving here was because once

I decided I was coming here myself I was really nervous trying to figure out, parking and stuff for the moving truck I had like the smallest u-haul and luckily there's a small loading spot I was able to use outside my dorm but I so I didn't invite any comments or anything but I mean if you're not, if you don't know the area, like how to work all that that could be really nerve wracking. Especially with a big truck like he said I think if I had moved my family I would have done the, what a moving company worry about all that and they can move on that was

my original strategy

Interviewer 2 - That was my original stretgy but moving company said you have to get your own permit. but then you have to leave at this time on this day so that we can park here, the people who were parking there didn't follow that. So then I was in this awkward situation.

Interviewer 2 - So, I guess, before we jump into the closing questions, considering that the purpose of this interview was to just kind of fully understand your call it serve surface transportation needs through campus and into and out of campus. Do you think that we've missed anything, any equities that you have any, any cares stakeholder needs that you would have?

Interviewee - I can't really think of any other questions. I feel like also my needs are really simple, because it's just me. It would be different if I was here with my family. I could just go into school I'd want to be near a school trying to figure that out. That'd be a whole nother whole nother thing but because it just me that it's a lot simpler.

Interviewer 2 - Yeah, for sure. Does anyone else have any questions that maybe I didn't think of?

Interviewer 1 - You find yourself wanting more. I know you have a pretty short commute walk them back but you ever wish this was more comfortable, more faster, more anything

Interviewee - You talking about for transportation wise, *Interviewer* 1 - Just
like how you travel in general?

Interviewee - I really liked trains, I just wished there was more subways around to different areas around the Cambridge area, because there's really only the red line.

And I think it's a great way, environmentally to transport people and because it's on its own line. You know dedicate line, you don't have to worry about traffic at all. But other than that, no. Sometimes I find myself walking around and I see these giant lines of cars and I'm like

I'm glad I'm not driving.

Interviewer 2 - You know what I feel like you would love. I went to Disney World this summer. And they obviously have a lot of different you know travel capabilities they've got the monorail they've got cars they got everything, but they introduce a brand new thing, which is,

I don't remember what it's called but it's effectively a ski lift.

And it just ski lifts you overall the parks and it's like a subway but imagine you're, you know, 30 feet off the ground. And then they create this big glass bubbles and so you just sit there alone in this peaceful little bubble. And he looked down at all the busy bees buzzing around facilities to have it's kind of like a gondola type system right yeah literally Yeah, that's exactly what it is. You can get on whatever you want, get off whatever you want. There's dedicated stations, and then you just sit on a bench, and like they have like a glass floor so you just like look down at people.

Interviewee - Yeah, I've seen some other countries that have public transportation they use stuff like that. In their cities, I think that would be cool to have.I've been skiing before too so

it's kind of fun to ride those

Interviewer 2 - Awesome, thank you so much for spending so much time talking in vivid detail about what some people might consider, you know, just like normal rudimentary stuff but it was very helpful for us to understand our stakeholder their needs and kind of what guides their needs. Does anyone on the team have any thing else to say or a close?

Interviewer 1 - Appreciate it.

Interviewee - Yeah, no problem. If you guys have more questions or want to interview me again or whatever, just let me know.

Interviewer 2 - Appreciate it. Sweet. Bye. Have a good rest of your day y'all. Take care.

Member 04

Interviewer: Thank you for making time to talk to us about this. To start, what comes to mind if you think about transportation and transporting yourself around campus and Kendall Square?
Student: Usually, I walk and I take my bike, but there's some big streets and barriers like cars that are kind of part of urban design. One thing I like is that during the winter, you can basically spend all your time inside getting from one end to the other end of the campus.
Interviewer: How do you generally transport yourself across campus? You said you use your own bike or blue bike, but are you familiar with the shuttles?
Student: Yes, I have used shuttles but not much. I don't know if it was because there was a snowstorm and I signed up through moebius or something else. I don't have much experience using shuttles, because I try to always be independent, with my own transportation. I think the scale of the MIT campus is quite large but they're not enough shuttles. There's not that many options, besides just walking to get from A to B.
Interviewer: You already mentioned some other MIT students as well, and from your perspective, if you think about the larger community of students, how do they transport themselves in and around Kendall square area at MIT? How do they currently arrive at Kendall square or campus coming from further away?
Student: I have friends that take the bus between Harvard and MIT. I do, however, think most of the students live in the campus district or in close proximity.
Interviewer: If you think about the students that you know, on campus, how do they typically get around?
Student: Mostly bikes but there have been quite a few bike accidents In my friends group or within our department.
Interviewer: What was the context of the accident?
Student: It was usually a bike accident with a car involved.
Interviewer: Pertaining to people that predominantly walk, what works well and what is the biggest challenge?
Student: So, again this may be more true in my department, but I feel like the MIT buildings are built like corridors, so we spend a lot of time walking through to get from A to B. You bump into people in these corridors, there aren't many community areas. I think what doesn't work very well is that the spaces of commute(passages) aren't very large, it's not pleasant to walk between the buildings with the wind – compared to Harvard. Everything is just bigger, not as much human scale in the transportation.
Interviewer: So, more of the social function – if you are going from A to B what is good and what is a challenge as far as optimizing for time or route?
Student: I think the layout is logical, there are some straight axes running across campus. I do think with those axes, there are a lot of barriers…there are long buildings and if you don't have card access, it's kind of exclusive. You spend a lot of your time on long walks through the corridors and you bump into people, so there's a lot of interaction happening. There aren't that many common spaces, shared work or FLEX workspaces or anything like that, but I think a lot of the interaction is just people hanging out in those corridors; it's effortless for diversity and bumping into each other. What doesn't work very well, is that the spaces of commute are a little bit too large and so it's not that pleasant to walk between these big buildings that are often windy. It

doesn't have the best ambience compared with Harvard. You can sense but it's just everything is just bigger. There's not so much human scale into transportation.
Interviewer: Interesting, so what are some of the things that are great about the method of transportation and what are the challenges?
Student: I wonder how much transportation there is between locations on campus. As a student I'm not going to engineering buildings but I do walk through those corridors.
Interviewer: There are way more people than just students…who else would use surface transport around Kendall?
Student: The whole corporate area and the commute happens at a greater scale…more suburban areas. For them, the transportation system needs to focus on public transportation and not parking for cars. I don't think this is the best use of space.
Interviewer: in a perfect near future what would transport look like?
Student: Actually, I think looking at using the water. It would be great to have more car-free zones. Thinking about the seasons, maybe more covered locations to park your bike. I don't know enough about the T, I just know you can take the green line and red line. Another thing, maybe attracting different walks of life, not just corporate or students – not just young professionals.
Interviewer: Are you familiar with MITs new innovation HQ?
Student: Is there an acronym for this?
Interviewer: yes IHQ/New Front Door
Student: No
Interviewer: It's the new building across broadway. So, how does wintertime affect transportation?
Student: I'm pretty impressed with the plowing infrastructure – it's just extremely cold, I can't spend too much time walking. The wind is also pretty harsh, so blocking the wind would be helpful – I use the buildings to avoid it. I don't think the bus schedule is very reliable, that's why I don't take the bus.

Member 05

Beginning of interview transcript (conducted on October 18th, 2021 via Zoom)

Interviewer: First question, how long have you lived in the area? Do you commute to campus or live on campus?

MIT Student: I've lived in the area for four years. The first 2 years I've lived here I live on campus. I now live nearby but off-campus.

Interviewer: If you live nearby off campus, how often do you commute to MIT?

MIT Student: Currently, about 2-3 times a week.

Interviewer: Ok, and do you travel outside of MIT often? For example, for your daily chores?

MIT Student: Outside of MIT, yes. Pretty much every day. My lab is at MGH so across the river. I go there most days. For chores, I definitely go to grocery stores around the area.

Interviewer: So when you travel to campus or around MIT, what mode of transportation do you use the most?

MIT Student: Probably biking in the summer and walking in the winter.

Interviewer: Could you answer why you prefer biking or walking?

MIT Student: For the distance that I am at, it takes me about 6-8 minutes maybe to bike to MIT from where I live. That's pretty convenient and I don't need to take a bus or anything like that. And I don't have a car, so I feel that it is the most convenient to travel intermediate distances that I need.

Interviewer: Do you use your own personal bike or Blue Bikes?

MIT Student: Currently using my own personal bike I bought about a year ago. But before that I was using Blue Bikes quite a bit.

Interviewer: Have you used other transportation methods like MIT Shuttles or T? Have you used other modes of transportation?

MIT Student: Definitely. I used to live at Tang Hall dorms, so kind of the far-end of the MIT campus. So, I took the Tech shuttle fairly often then to go up to the Kendal T station. And then I sometimes would take the T across the bridge to the hospital since it was just one T stop. If it was very snowy or rainy, I would do that instead of walking across the bridge. I don't take the Tech shuttle much anymore. When I first started, I also took the M2 shuttle (the Harvard one) that goes to the Longwood Campus. I had some courses there as well.

Interviewer: On a scale of 1 to 10, how happy are you with the current transportation options in the area? And what are your specific needs for a transportation system, if there is any?

MIT Student: Rating, I'm not sure. I don't really have any huge complaints, but it can be improved. So maybe a 7? The most important thing to me right now is probably bike lanes. They are nice to have when I'm trying to get to MIT and around MIT. Sorry, what is the other part of that question.

Interviewer: So I was going to ask, what are some of the aspects of the transportation system that will make you a happy customer. What are your specific needs for a transportation system?

MIT Student: Bike lanes are a really nice to have and for the most part they're good around MIT. Especially when I lived in Tang, there's a road that runs along the soccer field and tennis court area and the road on the south side of that is not in good condition. It's really, really bad and that needs to be repaved. I don't go there much anymore since I don't live there, but for the two years that I did live there, that was probably my biggest complaint. So that would be nice to have resurfaced. And it is also very narrow, so very often in each other's way. I think it's called Amherst Ave. or Amherst Alley,

something like that. That road is not in good shape and can definitely use some upgrades. For the most part, biking around MIT, there's the bike lanes. When you go through the middle of the campus though, there are nice open walkways with pedestrians, but there's not a rich division between pedestrians and biking in that area. There's no dedicated sidewalk or bike lanes. Some minor annoyance but that can also be improved. The Tech shuttle only runs one way around the campus and very often there's only one shuttle running the loop as well. So it would be nice to have two shuttles running on opposite directions if that is a possibility. That can be a minor improvement, but it would help make the system better for me and for other people who live on the far-end of the campus.

Interviewer: That is a very good point. How is the parking situation for bikes?

MIT Student: Pretty good. I haven't really had any challenges finding bike racks around campus. The Blue Bikes things [racks] are often depleted when I was using Blue Bikes. It was difficult to get Blue Bikes. One of the main factors that made me choose to get my own bike is the availability of the bikes. But since I have gotten my own bike, I haven't had issues with parking.

Interviewer: That is good to know. I tried to Blue Bike to one of my classes one day and there were no available racks. I was really embarrassed, and I didn't know if I should go back to where I got it from to park my bike. Thankfully, one student got her bike out of the rack. So, yes, that's definitely a challenge, but if you have your own bike that is probably much better. Before I go on to the next question, I would like to ask if you would consider switching to a new transportation service if you had a choice. Instead of biking, would you consider taking a new type of electric shuttle or other types of transportation?

MIT Student: I would be open to it if it is more convenient for me. Like I said, it is convenient for me to bike at the moment because it is not a very far distance.

Interviewer: So convenience is pretty important to you?

MIT Student: Definitely convenience will be the number one factor.

Interviewer: So, if you could add a new feature or service to this potential new surface transportation system? What kind of feature would you like to add?

MIT Student: What did you mean? You mean, like in adding a bike lane or resurfacing the road? Like those type things I already mentioned? Or you looking for something different?

Interviewer: For example, if there's any new electric shuttle routes, or other like bus routes that could be implemented? Are there any new features that you would like to see?

MIT Student: I mean, I guess if it's just meant to be replacing the tech shuttle then like having it go in two different directions, but because you don't want to get off, you know, you want to go from like 40 to 20, you'll have to go through like 40 50 60 70 80 90 back to zero and 10 20 instead of just going 40 30 20, if that makes sense.

Interviewer: Yeah. Okay. That's good. And the next question. I guess, the next two questions that we originally had were about the cost of the transportation system. But if you're just using your, you know, own personal bike, I don't really expect the cost to be an issue for you. But do you generally do you think that cost is an important factor in choosing your transportation method?

MIT Student: Yeah, definitely. So I mean, I think it's probably one of the reasons I don't take the T really often, I rather bike for a longer time than pay money to take the T, so cost is effective. Okay. So obviously, I wouldn't like it for an hour to avoid taking the red line.

Interviewer: Are there any other factors that might be important to you, for your needs of transportation? For example, if there's any new transportation system that has like automatic payment embedded, would you consider it to be a nice to have, or a must-have.

MIT Student: Yeah, automatic thing, it would be nice, it's kind of annoying to have to refill, you get to a T station, and you find out the card is empty, and you got to refill it while the train is leaving. So it just kind of direct, like I know in the New York subway system, and you can just directly tap your credit card on the subway turnstile or whatever. So there's no like, no intermediate thing. Yeah, something like that would be nice, I guess.

Interviewer: The next interview questions are around strategic alignment with our project. So, we are hoping to design a system that meets our strategic needs, which is the Kendall Square is basically the new entrance of MIT. That's the region's growth strategy to promote Kendall Square and the area. Do you see any… Do you feel that the main entrance is Kendall Square for MIT campus?

MIT Student: Oh, I would say somebody asked me managers, I probably say 77 Mass Ave. I guess to me, that just feels like the main entrance. I don't know. Like anybody's explicitly ever told me that. But just because that intersection of Mass Ave and coming across the bridge and the vast history, like a major intersection, and there's a lot of stuff around that area. Also, when I lived on the other side of campus is kind of like, left now the sporting facilities and getting to the actual buildings of MIT kind of go through that entrance. So it I guess I kind of think of 77 Mass Ave is the main entrance.

Interviewer: Isn't it where Killian Court is. Okay.

MIT Student: Yeah, Killian Court is like on. Memorial. 77 Mass Ave is like that complex of buildings on the west side. Walking from the student center. Yeah.

Interviewer: I think that's where the alchemist sculpture is.

MIT Student: Yeah, its building five.

Interviewer: Okay, cool. So, okay, that's really good to know. From your experience, how has the MIT transportation system evolved over the past five years? Did you experience a lot of changes in the past five years?

MIT Student: The way that I've used it has changed because I have moved, but I can't really think of any changes I remember being implemented since I started.

Interviewer: Okay. Do you expect to see any changes in the next five years? Or more specifically, what changes would you like to see in the next five years? Other than the improvements that you already mentioned?

MIT Student: I think I have covered what I would like to see changed. There's nothing else that really is jumping out to me at the minute. Improvements to this bike lane would be nice, especially with people still living on campus. Yeah, repaving that road, I think if that could be implemented in two years, then I would be pretty happy, next five years, whatever.

Interviewer: Okay, cool. The next question is about sustainability. Because our one of our goals is to implement a zero-carbon emission method of transportation. So how is sustainability or emission free transportation system important to you? Would you seek out a transport which is greener?

MIT Student: I think it'd be willing to pay a little bit extra for a system, who was, you know, part of that goal and I would also be more proud of MIT as a community as a school if they were saying that we're prioritizing green technologies, so yeah, definitely. I would say it's high on the list of important factors.

Interviewer: Okay, cool. Okay, I think that's all we wanted to ask you. Are there any other comments or needs that you would like to mention regarding the transportation system in general?

MIT Student: No, not really. I will send you an email if I think of anything, but I think that's pretty much poking my mind here.

Interviewer: Okay. Well, thank you so much for your time. I think the interview material was really helpful to us. And as part of this assignment, we are supposed to turn in some of the notes and transcripts from this interview. So yeah, we would like to thank you for your time.

MIT Student: Yeah, no problem. Good luck with the rest of your projects.

Member 06

Bolded items in green are the team's subjective opinion of the key questions.
Bolded items in blue are the team's subjective opinion of the key responses.

***Interviewer* #1 (A):**
All right, well thanks so much. So the premise of our project is that we're basically trying to do a stakeholder analysis for some of the transportation updates that are coming to Kendall Square, and are mee ng with a bunch of different people; students, teachers, people doing research in that area. Our whole class is trying to find out, what do people want, what do people need and then decomposing that in its many forms. So we sent over kind of a list of questions and we'll plan to go through those to make the most of your me. **So, do you utilize current transportation on a day to day basis in the Kendall Square area? And then, are there things that you like or dislike about your current transit situation?**

***Interviewee* (D)** :
Yeah I would say pre y frequently **I do use transit in the area of both the T, and then blue bikes, when they're available and then also some of the bus routes,** especially, I've used, I can't remember what it's called right now but there's the bus route that runs from this area over to North Sta on and back, I wouldn't say use that on the, on a daily basis but I have used that as well.

***Interviewer* #1 (A):**
Do you like those options or dislike them?

***Interviewee* (D):**
I would say I generally like them once I've managed to access them. I don't know that all of these are transportation specific issues but **certainly with all the construction going on, it can be a li le bit more difficult to navigate** on whether that's on, say like a bike when I'm trying to go to the store. Again, maybe not transportation itself, but with **when the streets are shut down and sometimes it gets quite difficult to detour around such streets** . So there's that.

And then certainly, with the construction going on around the T sometimes that's a little bit difficult to access the car situation depending on the street. It's really not too bad I don't think, to kind of navigate through and around cars, but **certainly some streets are busier than others with more traffic** . So there's that. I guess that's a long answer to your ques on but **essentially once I'm on the transportation I don't mind it too much, it's kind of getting to it and getting situated aboard it that can be a pain in my mind.**

***Interviewer* #1 (A):**
What are your thoughts as someone that's kind of studying transportation, in the Kendall Square area, and like the renovation process that's happening? Are you involved with it?

***Interviewee* (D):**
I'm not involved in it at all, **I am a transportation student but this is my first term here so I haven't been involved with it in any way** . Yeah, I would say one thing that I have looked through your questions and, and I know there's some questions about like autonomous vehicles and Kendall Square and in the future and things like that. Well I understand **one of the issues with the transportation especially, automotive transportation in the area, is the cost of installing new**

parking, and how much it costs to build a park, to build anything, let alone a parking spot . And so I think that **transportation in the area will be challenging as long as people need to park on site** . **The availability of other modes would be necessary, just because it's cost prohibitive to build,**

***Interviewer* #1 (A):**
So you're saying, your constraint is parking versus the actual transportation - right?

***Interviewee* (D):**
Yeah, so there's this transportation itself but if people want to dive in I mean, it costs me think about how much it costs to build a building there per square foot and then think about making that a parking space like, as long as people need to park in the area. I just think that effective transportation is probably necessary.

***Interviewer* #1 (A):**
So, I mean kind of leading into the next ques on right: **What are your thoughts on autonomous vehicles, one? What other modes of transportation do you think could solve that parking conundrum** , which I guess would in turn also solve some of the, the ability to get around construction, hopefully...

***Interviewee* (D):**
I would hope so. I think the ques on was about autonomous vehicles, right? Yep. **I think that with autonomous vehicles, one downside I see is if the ability of more people to drive their own vehicles results in more traffic conges on, it may flow more smoothly but as far as pedestrians, it could be more of a pain to cross streets and things of that nature so I don't know what additional infrastructure might be needed.** There like this kind of supplant the need for say, additional parking infrastructure in the current situation. **But I suppose personally one of my, one of my personal hopes for autonomous vehicles would be that the efficiency of them and their ability to operate would be recognized** . **Certainly you can park and drive in tighter quarters than human drivers.**

I would hope that public transit and mass transit and other things of that nature might be able to leverage the autonomous vehicles to transport more people on a more stable schedule. I know that they get off schedule and there are delays and you have to wait, twice as long as you think so . If autonomous vehicles allow a more steady schedule I would hope that that allows or encourages people to, per se, right, mass transit because it is more reliable. And on the flip side, I think that one might be able to hopefully get some of the benefits of that autonomy that those autonomous vehicles without necessarily owning their own.

I do wonder. I do wonder sometimes, when it comes to autonomous vehicles. I mean you guys are, I think, probably more in the business school and more aware of us than I am but I wonder if the current, the current car ownership model where each family needs. Everyone needs that individual car if those could somehow become essentially more shared, if that was on a smaller scale, accomplish the same goal, which is, if like four of us in the pod, and one of them cars as opposed to four cars, then that kind of accomplishes the same goal I'm talking about with fewer vehicles being able to accomplish the same amount of transportation, like that's kind of what I care most about is getting people from where they are to where they're going. And so I do wonder

that as well about autonomous vehicles if at all. **A path there to kind of change the current car ownership model where it's like a car per person currently and maybe a car per group of people in the future.**

***Interviewer* #1 (A):**
That's really interesting. That's super fascinating to me because whenever I first thought about autonomous vehicles, I had a typical mindset of, like, I go get a Tesla. Versus having mass transit be autonomous or changing the way you even view transportation and that's super fascinating to me.

***Interviewee* (D):**
Oh yeah. One other thing on mass transit. On that front, **one of the largest costs for mass transit is operations** - like hiring operators, and I'm all for good well paying jobs. I think that's really important. **But certainly, if you didn't have as many operators that's more money you could either use to redirect to system expansions or even more frequent service,** so like there's some budgetary stuff that could potentially go on there as well.

***Interviewer* #1 (A):**
No, that definitely makes a ton of sense, this super interesting. So, kind of continuing this thought of like, **what's the future?** I know the next ques on was, thoughts on carbon emissions and new mobility, but, we kind of talked a li le bit about that. So what, **what's your thought as it relates to sustainability and transportation the future of transportation?**

***Interviewee* (D):**
I hope that we're able to successfully address it I guess . I do worry that with autonomous vehicles, if we all just start driving more because it's easier than normal car operations, that kind of could negate some of the benefits of alternative fuels and things of that nature. But certainly, **I hope that increases in efficiency, decreases conges on and me spent in traffic, especially if there is a change to the model of car ownership... all of those things could hopefully contribute to, to reduction in greenhouse gas emissions .** That would be my hope.

I decided to a end a talk last week with a professor. I can't remember what school but the **professor was talking about how she believed the future was going to be mixed air ground mobility. So like cars that fly and drive** , and that I think made me very nervous about the potential of greenhouse gas emissions because the energy intensity use would just be so much greater. I don't think that's realis c at all, personally, but yeah so I guess what the future is... **I don't know, but I hope that efficiency gains and technological advances and like an actual desire on the part of people to make the changes necessary... I hope that these three things are able to flow together and make improvements.** I'm pro-public transit personally, but I know that that's not everyone, especially with the current situation, there's got to be a broad range of things. Yeah.

***Interviewer* #1 (A):**
Well, interesting, because like I just personally, I was never a huge fan of public transit because I grew up in Chicago, which had a terrible public transit system when I was growing up. It kind of exists, but it's not that great. But then I spent me in New York and I was like: This is amazing!, and then me in Japan, where it's a godsend. So it's just really interesting that you say that... **How do you see that being implemented in Kendall Square, like a kind of more robust public mass transit system like that?**

***Interviewee* (D):**
I think that it's possible because of the cost of everything in Kendall Square like I know the **real estate costs are pre y wild in Kendall Square** . And so I think that part of it is, **what the alternative would be? And if the alternative is enormous parking prices and terrible conges on and I think it's, it's more likely** . Although I personally would hope kind of what you said about being from Chicago and por olio trends and know that I am not, I'm not out here trying to be like public transit hasn't been implemented in a great way. **I'm more like well if we did it well it might be better for everyone.**

***Interviewer* #1 (A):**
Totally. So I would think part of it is just like if people are actually interested in pursuing that. I would hope it's doable and then also the alternative, like if it's just huge prices and terrible conges on, that would also drive people I think the relative cost would be lower.

So, what are your thoughts on the current situation? What are some of your thoughts on the pain points of current transportation and or do you think there'd be a fear in the community of change of transportation in the area?

***Interviewee* (D):**
I think some of the pain points again for me are really related to the road network. I don't know if either of you have cars out here but just like driving in the area kind of sucks. I find that when I drive by and you know, I get lost because I take a le that I think is going to intersect a different street and I end up like a mile and a half from where I thought I was going to be. So I would say that just the road network I find it to be a pain point.

The subway system is, again, kind of what I was mentioning, where once I'm on it. I'm quite happy with it. But, you know, yesterday I went to get on the red line and they were doing track work down on the far end of the red line and so the trains were incredibly infrequent... It was like, one in 4 minutes, one in 20 minutes and one 2 minutes a er that.

So that's, I think the main point related to reliability and most directly to Kendall Square, I think that the T stuff is pre y good there. I suppose I wish the bus system did a be er job of connecting with the T system. I mean, certainly like if I'm trying to go from MIT, up towards Cambridge Avenue… It's kind of a pain to find a bus that would go that direction, whereas there are other places where you can catch a bus up like Prospect Street if you're at central square, so I guess I would hope for a li le bit more reliability. Reliability which is a pain point and then just integra on of the entire transit system there's a lot going on there. And sometimes it's all going different directions, from what I've experienced.

***Interviewer* #1 (A)** :
It definitely makes a lot of sense! **So, what do you see as the vision of transportation, the next 10-15 years, both broadly, and then in the Kendall Square & MIT areas?**

***Interviewee* (D):**
Yeah. I mean, honestly, partly because of the pandemic, which I'm sure you guys talked about all the me and all kinds of contexts…. but **I think that one of the relative benefits of public transportation is that it can occasionally be, if not faster than as fast as driving alone, and**

parking can be really expensive . But, **if people continue working from home and it's just going to be less, those relative advantages will dissipate. There won't be as much of a need to avoid conges on because there'll be less conges on.**

So I guess if I had to say my expectation, it is that transit will continue to be relevant and dense areas like Kendall Square. I'm close to Kendall Square and can drive there. But, I mean, **it's expensive to park. It's kind of a pain to get there** .

I think that in the next 10 to 15 years, there'll be continued transit use hopefully with some shifts to maybe automation on the rail lines. I think it'd be easier to automate those vehicles without drivers on something that's got a fixed guideway like rail. Then, kind of beyond that point I would expect more of a transition to self driving vehicles, so less of a demand for parking spaces, and more more steady traffic flow.

For transportation, more broadly, I think that there needs to be a look for a kind of change in our current system; which is like a lot of a lot of ci es, similar to the Hub and Spoke airline pa ern where transit lines are all oriented towards downtown. They take you into downtown in the morning and out of downtown in the evening, and realize that **there's a lot more lateral movement from suburb to suburb or farther out to farther out and not everything is kind of oriented towards downtown.** I think that one of the things I expect to change in the next 15 years is that orientation, like not everything is pointed towards downtown.

***Interviewer* #1 (A):**
Oh, that's really interesting - I never really thought of that. That's interesting. So those were like the prepared questions I had. I don't know if [*Interviewer* #2 (E)], you had anything you wanted to tack on there. But one last thing I would just ask generally is that: you know we're doing the stakeholder analysis; so we're talking with organizations, companies and students. And **it sounds like some of the key things that you've brought up are infrastructure parking and looking at the cascade impacts on the area surrounding the improvements.**

One - is that an accurate summary and the two - is there anything else that you think from a student perspective, that's really important that we should know about for your needs in that area?

***Interviewee* (D):**
I think that that's all pre y accurate , I would say that's pre y accurate. As a student, I am okay with that. Kind of unrelated to transportation, **Kendall Square does seem like another area to me that's relatively oriented towards the Business Week.** So I don't know how that plays into this. I haven't really, I guess thought it through how that would impact transportation. But **I know it's easier to navigate on a Saturday than a Thursday** , yeah. Sorry, I guess maybe that would impact it somehow but I don't have an answer on that point, other than it's easier to navigate on the weekends.

***Interviewer* #1 (A):**
Well, hopefully, whatever solution gets developed, at least , keeps it so that during the weekday the solution is as op mal as the weekend. And that might be another infrastructure type thing. Very interesting. [*Interviewer* #2 (E)], do you have any questions that I've missed?

***Interviewer* #2 (E):**
Okay, well, so this is a simple ques on but **where do you live? Is it near campus or far away?**

***Interviewee* (D):**
Yeah, no, I live near campus. **I live near Flour Bakery. It's like on Mass Ave** .

***Interviewer* #2 (E):**
And how long have you stayed here in Boston, Cambridge?

***Interviewee* (D):**
Yeah. So, i **n this apartment, I've been here for, I think, two months** . But in the past I lived in Somerville for a while so I would say, **if we're counting, previous me then, over two years.**

***Interviewer* #2 (E):**
Okay. Okay, thank you.

***Interviewer* #1 (A):**
Yeah. Well thank you so much, [*Interviewer* #2 (D)] for your me. This is super interesting. Yeah, your world is fascinating and I'm thinking about some things a li le differently so I really appreciate your me today.

***Interviewer* #2 (D):**
Yeah, sounds good! It was nice to chat about this and I hope things go well, and best of luck, and it's nice to meet you both. Awesome, thank you so much!

***Interviewer* #2 (E):**
Have a good day. Okay. Yay. Okay now I've stopped the recording and thank you, [*Interviewer* #1 (A)] for your facilitation!

Member 07

Student *Interviewee*: “Daniel” Class of 2023 Undergraduate Senior, majoring in computer science

Daniel: Hello, how are you doing guys?
Interviewer 1: Doing well. This is *Interviewer* 2, my colleague and classmate.
Daniel: Nice to meet you *Interviewer* 2.
Interviewer 1: Thank you. Daniel, we're going to ask you a bunch of questions. There's a whole thing that we need to read out to you at the beginning. And *Interviewer* 2, please feel free to also ask questions and follow-ups to questions and interject and all of those good things.
Interviewer 2: Absolutely thanks for having me.
Interviewer 1: Are you ready, Daniel?
Daniel: Yeah, I'm ready, let's do it.
Interviewer 1: And by the way, this is being recorded, but I'm going to mention that part also.
Daniel: OK no problem man.
Interviewer 1: OK. Uhm, hi Daniel, as you know my name is Adam.
Thank you for agreeing to be interviewed. We would like to understand how the future of transportation looks like in the MIT campus and Kendall Square area. *Interviewer* 2 and I are both graduate students at MIT. This is part of an assignment for the EM.411 Foundations of System Design and Management class in the MIT SDM program. This interview will take approximately one hour. What you tell me will be considered confidential.
This interview will be reviewed only by instructors for grading purposes and will not be published or cited anywhere. Individual names and other personally identifiable information will not be disclosed. We believe your input will be valuable to this assignment and in helping in growing our professional practice. With your permission we will record audio and take notes during the interview. The recording is to accurately record the information you provide and will be used for transcription purposes only. If you choose not to be audio recorded, we will take notes instead. If you agree to being audio recorded but feel uncomfortable at any time during the interview, we can turn off the recorder at your request. If you don't wish to continue, you can stop the interview at any time. Do you have any questions or concerns before we begin?
Daniel: Nope.
Interviewer 1: OK, sounds good so Daniel, can you please tell us more about your involvement with the MIT community?
Daniel: I'm an undergraduate student in the class of 2022. Took a gap year. I stayed here for a while and I resumed back to school this semester. I'll be graduating in the class of 2023.
Interviewer 1: Great Daniel so it in total. How long have you lived in the MIT area? Could you say that again?
Daniel: Yeah, so since 2018 so it's been almost three years.
Interviewer 1: OK, great and can you tell us a bit about what your day looks like on an average day in your life? During the weekday and over the weekend.
Daniel: Yeah, so it's pretty mixed. I'm also a part of a fraternity. Mostly on the weekdays, my commute is from my dorm on the West side of MIT's campus.

Uh, for our northwest side of his elbow, MIT's campus.
Daniel: I usually walk when it rains. I try to take the bus, but it sucks so I usually walk and just get wet. To my frat, I sometimes take the one bus there from Harvard to cross the river and on the weekends, I mostly commute with Ubers on the weekends because I usually go out at night to parties and there is no public transportation during those hours.
Interviewer 1: You mentioned a few different forms of transportation that you use. Do you have a favorite form of transportation between those?
Daniel: So currently all of the available public transportation methods are really bad. I don't know if you consider blue bikes as a type of transportation… *Interviewer* 1: Yeah, definitely.
Daniel: Blue bikes is definitely my favorite one. There can be some enhancements and improvements there but overall, I think that's the one I use most currently.
Interviewer 1: Can you tell us a bit more about why you find the general state of transportation to be very bad?
Daniel: Yeah, transportation options are only on main roads. Nobody lives on the main roads. It's mainly for institutes, buildings or companies, which I understand for companies. But there are a lot of students around this area. We still don't have any bus stations close to our place. There's no bus station close to my frat. There is no bus station close to my dorm which is where I am used to. In the mornings the bus that commutes to MIT from my dorm is very inaccurate and you can never trust it. When you wake up in the morning, I want to go to class, but the last thing you want is an angry driver that shuts the door on you. I tried that a few times and I just stopped using it.
Interviewer 1: Have you actually had experiences like that where the driver was unpleasant?
Daniel: Yeah, drivers are extremely rude overall.
Interviewer 1: That's been your general experience?
Daniel: Yeah, I'm the type of person where when I walk in the morning or afternoon I always say hello. I always try to make small talk.
Daniel: Now I understand that sometimes people don't want to make this small talk and it's totally understandable. But there is a huge difference between not wanting to make small talk and being very rude and disrespectful.
Daniel: It just feels like they're doing something they don't want to do, and they most likely got to the point in life where that's their only job and they're pretty pissed about it. And that kind of sucks going and getting that vibe from them.
Interviewer 1: Are these public buses or are they MIT buses?
Daniel: So these are public buses. In terms of MIT buses, that's even worse. MIT has like few solutions for students and are very inaccurate. From 10:00 PM to 1:00 AM there is an MIT shuttle which if you order, it takes around one hour to get to you. Which is unusable. Like, how, why? In a timespan between an hour, an hour and a half, it will arrive, so I cannot plan anything.

Interviewer 1: Daniel, you mentioned that your favorite form of transportation is bikes. Do you prefer bikes over walking?
Daniel: It depends. So if it's late at night, I'd rather bike. If the weather is nice, I'd rather walk. If I wake up late, then I bike, but I actually always do prefer walking.

Interviewer 1: So it sounds like you're saying out of the options at your disposal the order of preference would be walking then biking and then taking a bus.
Daniel: I'll avoid taking the bus as much as possible. I used to live in Tel Aviv and the public transportation there is not the best, but it's still way better than here. Like for example we have the T. But if I want to get from my dorm to the T it will take me around 40 minutes.
Which in that time I can walk anywhere, so it's just useless.
Interviewer 1: When you mentioned that transportation in Tel Aviv is better, can you give us some more information about that? What makes it better?
Daniel: There are many more lines. Lines that don't go just through main roads.
Interviewer 1: When you say a line you mean like a bus route?
Daniel: Yeah, bus routes. They don't just go to the main roads. In every neighborhood, there are a few stops. It's very, very clear what time the bus gets there. It's very clear where the bus stations are and it's just way more user friendly.
Interviewer 1: Got it. And what do you like about it? Sounds like you do like the blue bike option. What do you like about it?
Daniel: There are so many stations. I can just go to a station and grab a bike and go wherever I need to go. Whatever my destination is, I can be sure that within a 5-to-10-minute walk, I'll find the station and park the bike.

Interviewer 1: Why do you still prefer walking over biking?
Daniel: Because sometimes in rush hour, it's not that easy to find a bike. And it's not guaranteed, you'll find parking. And if I bike for 15 minutes or 10 minutes and then have to walk to my destination for another 10 minutes, I'd rather just walk for 30 minutes.
Interviewer 1: Got it, that makes sense.
Interviewer 1: While you're commuting, is there anything that you like to do? So if you're walking or if you're taking the bike, or on the rare occasions that you're on a bus, what are you doing? Are you talking to a friend on the phone usually? Are you listening to music?
Daniel: Yeah, so it depends on the time of the day. Usually in the mornings I make phone calls to Israel. And if I walk during the nights, during Israel nighttime, I listen to music.
Interviewer 1: If you add to try and quantify how often you use or interact with Cambridge transportation, any transportation.

Interviewer 1: For each type of transportation, can you tell us how much you use it? How often do you use it?
Daniel: In my first year, I used to take the T a lot to Harvard. I used to take the 1 bus across the river. Now, every day I have an option to either go to Boston around Prudential or I go to the Harvard area and I can basically take either T or the bus. I could take the bus but I just truly prefer not to. The last time I took a bus it was a rainy day in November. It was a Friday and it was cold and I got all wet. There were few buses around and they weren't stopping at the bus stations. You just wait there miserable, waiting for a bus, and you keep seeing buses just pass by without stopping until a bus did stop but the driver just shut the door on people. And then I decided I didn't want to go on buses anymore here.

Interviewer 1: So you mentioned how frequently you use buses. How about blue bikes? How frequently do you use blue bikes? How often?
Blue bikes I use at least once a day.

Interviewer 1: Do you have a membership or do you pay for every trip?
Daniel: I have MIT's membership but I still haven't gotten a refund for it but I filed for it. I paid the full membership and I have it now, although I heard they're only doing it for like 3 months. Also, MIT doesn't really advertise it, although I think they should because they can support student's physical health,
Interviewer 1: When did you file for the refund?
Daniel: I purchased that in mid-September.
Interviewer 1: Oh, so it's been awhile. How about walking? How frequently do you do that?
Daniel: Let's see. Well, I think I can give you some numbers… So I walk 9 kilometers on average a day.

Interviewer 1: Oh wow, that's a lot.
Daniel: Yeah, I walk a lot.
Interviewer 1: OK, interesting, and could you tell us a bit more about where you walk on a typical day? Where are you walking from? Where are you walking to?
Daniel: Everyday I walk from the far northwest side of campus to the far North East side of campus.
Interviewer 1: Is the northwest part where your housing is?
Daniel: Yes. So, I do that walk in like 20 minutes with change, at minimum. Sometimes I do it like 2-3 times a day because I like studying in my dorm, but I have classes. I'm also trying to eat lunch in my dorm, so I would go in and out. And every other day I'm going to the Boston side and at least once a week I'm around Harvard's campus.
Interviewer 1: On a scale of 1 to 10, how happy are you with the state of transportation in the MIT area?
Daniel: Do I take blue bikes into consideration as well?
Interviewer 1: Yeah, overall.
Daniel: Overall, I think around like 3 out of 10.
Interviewer 1: Oh, that's very low. Can you tell us a bit about why that's the number?
Daniel: If I only have the blue bikes option, which seems feasible to me and still it isn't quite good all the time, then yeah, if I'm forced to walk, I don't know what's going to happen in the winter, it's going to get cold soon, it's going to rain, it's going to snow and I won't be able to bike. Biking will be too dangerous. I'll have to walk all the time and then I'll just get wet and be extremely cold.
Interviewer 1: Is that the main disadvantage of the blue bikes? The fact that you're not protected from the elements?
Daniel: The blue bikes option is only valid through hot months. Like in a month from now, I won't be able to actually bike.
Interviewer 1: What are the things in your mind that work really well with the current state of transportation in the area?
Daniel: I guess the 1 bus is fine. We can make it a bit more frequent. I think the 1 bus is fine because it goes through the main spots like Central, MIT Campus Center, and central Harvard campus. And it crosses the bridge, which is the coldest part. But other than that, it's all really bad.

Interviewer 1: Is there anything that the city or MIT could do to improve service and encourage you to use the buses or the blue bikes even more frequently.
Daniel: Yeah, MIT could give better subscription plans for blue bikes. That's one. And take care of all the refunds in a way better way.
Daniel: And second, the bus stations. Like, come on. You know it's raining. You know, it's cold. How the hell are you not going to have a cover for students? I don't know when the bus is going to arrive and you're making me stand there and just get wet. You have so much money just like spend the $10,000. You know what I mean? It's like very basic, in having that at the bus stations. In addition, we're the tech school. Why is all the tech we have so bad?
Interviewer 1: Can you tell us a bit more about technology that is related to transportation? Like what are you thinking?
Daniel: You can have a screen on every bus station that tells you when the next bus is coming. You can have a chip in every bus that tells how far it is.
Daniel: You will have to use some electricity, but like, come on, all buildings are owned by MIT. So they can wire the line to have electricity in the bus station. In all the dorms back in my freshman year, there used to be a TV on the entrance of each door that tells you when the next bus is. First of all, the UI was horrible. It was never right.
Daniel: Yeah, hello yeah I'm back OK.
Interviewer 1: Yeah, you're good, so you were talking about the UX of the MIT app.
Daniel: Yeah.
Interviewer 1: Previously you had mentioned some ideas about a Geo location for the buses and maybe a portal where you could see where the buses were, how far away they were from you. You mentioned another idea about maybe even displaying how far the buses were away from you at the bus station. Is any of that stuff happening today?
Daniel: I'm right next to the bus station at MIT Center and I don't see any screens here. And in addition, during the winter time, most buses are packed with people. And it doesn't matter if it tells you how far the next bus is if it doesn't tell you if it's going to stop for you. So they should add something for capacity that the driver should press if he's not willing to open the door for anyone. Also, we had a few things in our dorms to show when the next buses will come, but they were all very inaccurate and now none of them work.
Daniel: I think whoever used to maintain that graduated. And now it just says there is an error.
Interviewer 1: What about blue bikes? Any improvements there that you think the city or MIT could make?
Daniel: I think maybe a bit more stations. Because like my dorm for example, if I try to get a blue bike at 9:00 AM, there's no way I'll get it. And there is only one blue bike station.

Interviewer 1: So you were telling us before about potential improvements to blue bikes and you had mentioned maybe having more stations, anything else?
Daniel: Maybe they should add some sort of helmets. In Israel we have those for all of the public bikes. Actually scooters have options for helmets.

But I think that's more of a Blue Bike improvement rather than something MIT can enforce. But yeah more bikes and more stations around campus. I don't know who decided where the stations will be, but he definitely wasn't related to MIT at all even though all the

stations have MIT logos on them. You can see there are some stations that are completely empty all the time and on the other hand, stations no one uses.
Interviewer 1: You mentioned that you walk around campus a lot. Are there any improvements that the city or MIT could do to make your walking experience a better experience?
Daniel: Maybe when it gets colder, uh, when it snows and rains I think they can do a lot. But it's more infrastructure work on the roads. Just to make sure the rain water goes through the drains and does not stay on the sidewalks.

Interviewer 1: So it sounds like you're thinking about ways to make driving safer for cars, but also for buses.
Daniel: Yes.
Interviewer 1: Oh, and you want it to be easier to walk on the sidewalks.
Daniel: Yeah.
Interviewer 1: Got it, got it. That makes sense. You mentioned walking and riding bikes a lot. Is sustainability a motivation for you?

(Connection Issue, Daniel Moves Inside Building)

Daniel: Hey. Are we better now?
Interviewer 1: yeah.
Daniel: Sorry I don't know. Yeah, I just couldn't find any quiet space on campus so I had to go out. We can have another meeting about that. (jokingly)
Interviewer 1: So you mentioned that sustainability is also a motivation for you. Can you say a bit more about that?
Daniel: Uh, can you elaborate on what you mean? Like sustainability in the transportation context?
Interviewer 1: Well, why don't you tell me what sustainability means to you?
Daniel: More like reusing. I don't see it in transportation though. I see it as more like it is sustainable for me to use bikes correctly.
Interviewer 1: Oh well, for yeah, exactly so. Presumably bikes and walking use less fuel, emit less pollutants, etc.
Daniel: Yeah. Yeah, well in the current bus system I feel like I don't, I don't see like whoever I know who uses the transportation here most probably don't. You have cars 'cause the transportation here is so bad that you only use it as a last resort.
Interviewer 1: Uh-huh
Daniel: Uh, like public transportation. I'm not talking about bikes, scooters, etc.
Interviewer 1: Right, could you just clarify whether or not sustainability is something that you care about, and if so, why or why not?
Daniel: Yeah it is. And why? I think we all know what climate change is gonna do to all of us, and if we have good public transportation, it will mean that less people will have their own cars and with less people that have their own cars, we'll get to a point where people don't drive alone in their car, which is ridiculous. Uh, maybe MIT can do something like some sort of a share ride app. Where people who do have cars, like there are teachers or faculty that can actually...

(lost connection)

Interviewer 1: No, yeah we can hear you now. We were talking about sustainability and you mentioned that public transportation is really important for sustainability purposes.
When you choose to walk or to use the Blue Bikes, do you ever do so for sustainability reasons? It sounds like back maybe isn't as high on your list of priorities.
Daniel: Probably not. If Uber was cheap, I'd probably just Uber all the time, so I'm kind of lying here, you know.
Interviewer 1: Well, we appreciate your honesty. By the way, we've mentioned cars, have you ever driven a car around the MIT and Kendall Square area?
Daniel: Uh, just like very few times.
Interviewer 1: And and the few times that you have?
Daniel: I drive to New York. I drive to NY almost every month.
Interviewer 1: Oh interesting, OK.
We can hear you, we can hear you, so can you say that again you drive to New York every few times a month?
Daniel: Yeah. I drive to New York once a month.
Interviewer 1: And when you've driven around the MIT area, what has your experience been like?

(lost connection)

Interviewer 1: So you said that you drove to New York a few times a month. How was the driving in the MIT in Kendall Square area?
Daniel: I don't feel like I have any complaints. Except maybe the rush hour. Which makes it a bit difficult. But yeah, I don't have any concrete complaints about that.
Interviewer 1: And how do you get a car? I'm assuming that you don't own a car. Do you own a car?
Daniel: No, I'm renting a car from Avis through MIT.
Interviewer 1: Ah, and how easy is that process?
Daniel: Uh, with MIT's membership. It's pretty easy.
Interviewer 1: I'm happy to hear.
Daniel: I have an Avis right next to my dorm. I pick it up. I park it there, give them back the keys.
Interviewer 1: And on the topic Daniel, of personal vehicles, how do you feel about Autonomous vehicles? Would you ride one?
Daniel: Uh, if there will only be autonomous vehicles, I'll ride one. Uh, but if not, which that's not gonna happen like in the next 15 years. I won't drive the first ones that go on the road, but I'll probably drive the next.
Interviewer 1: And why wouldn't you be an early adopter?
Daniel: Like, uh? Uh, 'cause uh, the way an autonomous car works is like learning by experience. And I don't wanna be the one that's helping it gain experience so fast. You know, I'll let other people do that and that, and then I'll hop along.
Interviewer 1: Uh-huh got it.

Interviewer 1: What are your thoughts as a pedestrian or cyclist with the potential to share the road with autonomous vehicles? Because even if you don't ride an autonomous vehicle, you might have to share the road with autonomous vehicles.
Daniel: Yeah, so like the past year, I think there were a few accidents already, I think.
Interviewer 1: In the United States? In the world and the MIT area?
Daniel: Ah. I feel like. Look, like if there will be all autonomous vehicles around here now, it will probably drive very very slow. Uh, so I don't think it will be able to do much damage to me, so I wouldn't mind. Driving along with it, but I don't want to be in it. It will be too damn slow, but like I
wouldn't mind biking by it next to me. Uh, but, if it is fully functioning, I might be a little scared.
Interviewer 1: Got it. How much do you use Kendall Square as a hub for transportation or entertainment? Have you suggested it for friends and family visiting?
Daniel: Oh no, this place sucks.
Interviewer 1: Why does it suck?
Daniel: Uh, I, I think like let's compare MIT to Harvard area or Berklee's area or any other university. Uh, what MIT is basically trying to do there is build very very nice buildings. MIT owns the entire area and as everything else they do, they just want to make more money. So what they do is they rent to restaurants which can afford that area. But if you look, most MIT students come from low income families that won't be able to afford lunch or dinner in any of the restaurants that are there. So it just makes a lot of MIT students avoid that area 'cause everything will be so damn expensive.
The only place you have now, which is reasonable, but I hear a lot of MIT students still avoid going there, is Chipotle. Uh, but with all of the new buildings MIT will have to rent it all to like high end restaurants. Of course, MIT is bringing a lot of high tech companies to that area.
And MIT just doesn't take care of their students.
All they care about is generating more money, and that's why they're bringing all these companies and making all these places.
Interviewer 1: So, do you feel that Kendall Square is a place for the community to come together?
Daniel: Not MIT's community.
Interviewer 1: Oh, that's a good point. So who? Whose community is it well suited for?
Daniel: People with money. People that work. And make money.
Interviewer 1: And what could MIT do better to make it a place for the student community?
Daniel: Bring more affordable dining options.
Interviewer 1: Got it. Besides dining, are there any other types of entertainment venues that you think MIT could bring to the area to make it better for students?
Daniel: Like in the center of MIT they're doing the music center, but that will be open in the next few years, which will be very good for students. There are a lot of sporting areas that students can go to. I think the thing MIT misses the most is dining. And dining is what brings people together. Eventually people don't have time here to do other things than eat.
Interviewer 1: Got it. So Daniel, are there any other features or services specifically to the transportation network in Kendall Square that you haven't mentioned thus far that you think might be worth adding. And it's OK if you've already mentioned everything that you have in mind.

Daniel: Yeah, I think I mentioned everything.
Interviewer 1: OK.
Daniel: But I'll repeat that I think more bike stations.
Interviewer 1: Is a big thing OK, uh, *Interviewer* 2? Do you have any questions that you want to ask Daniel?
Interviewer 2: Yeah, just a couple quick names. Things we came across getting ready for our research. One thing we came up with was that Cambridge has dedicated themselves to Vision Zero. Have you ever heard the Vision Zero phrase?
Daniel: No, I don't know what it is.
Interviewer 2: OK yeah, so they were out to make sure that everything was ready so that bikes and cars and pedestrians all had separate areas to be so that there would be no collisions.
Daniel: Uh, I'm not sure I agree on that. Yeah, a lot of roads with no bike lanes.
Interviewer 1: So Daniel it sounds like you're saying that based on your experience in practice, there are still a lot of roads that don't have a bike lane.
Daniel: Yeah.
Interviewer 1: Got it. And generally speaking, do you feel like…?
Daniel: And also the roads with bike lanes are not safe for bikers because they have a lot of holes in a lot of bumps.
Interviewer 1: Uh-huh. What about safety for pedestrians? For people who are walking.
Daniel: Ah, I feel it's pretty safe with pedestrians.
Interviewer 1: Got it.
Interviewer 1: *Interviewer* 2, any other questions for Daniel?
Interviewer 2: Um just for a quick thought. At the beginning you had a lot of wind (background noise). Uh, what's your major?
Daniel: Oh, I'm majoring in computer science.
Interviewer 1: Awesome.
Interviewer 2: Do you think that, do you believe that factors into your answer on autonomous cars?
Daniel: Yeah, probably.
Interviewer 1: Perfect. Daniel, thank you very very much for your time.
Daniel: Thank you guys, I've enjoyed it.
Interviewer 1: I've enjoyed. Uh, we appreciate it.
Daniel: Sorry it was very windy.
Interviewer 1: And oh, don't worry about it. We've got what we need and will let you know if we have any follow up questions.
Interviewer 1: And have a great rest of your day.
Daniel: Awesome, you too guys. Thank you.
Interviewer 1: Bye Daniel.
Daniel: Bye bye.
Interviewer 2: Thank you, Adam. Thank you Daniel.
Daniel: Thank you *Interviewer* 2. Bye bye.

PhD Student

SDM: Do we have your permission to record?

PhD Student: Yes, you can record.

SDM: Okay, thank you, we are going to scrub the names of everyone from this. We have a mandate to get verbal affirmation of informed consent. I think the other important bits are that we're utilizing this for class purposes, all of the data will be aggregated with everyone else's interviews.

So, can you tell us a little about your background, what you're studying, what you're doing, and everything else, like that.

PhD Student: My name is ___ I'm a third-year PhD student in the EECS department, so I've been here at MIT for two years, so this is my third year. I'm from South Carolina. I did my undergrad at Clemson and I am here now studying legged robotics research.

SDM: What is EECS ?

PhD Student: Oh EECS is electrical engineering and computer science.

SDM: Okay alright sounds pretty interesting. What is your doctorate going to be about?

PhD Student: My lab does legged robotics so you know we are in the lab with the mini-cheetahs. We build robotic hardware and we really care about how can we make robots that are generally very conservative in their motions really use their hardware so they can move more dynamic, fast, and aggressive, for example, like jump splits and those kinds of things. What I work on specifically is blending mathematical optimization, which is very rigid and reliable, with machine learning that is very flexible but also kind of noisy. The intersection of those two make what we call controllers that drive the robotic hardware. That is what I work on.

SDM: All right, so you've been on the MIT campus for about two years, then.

PhD Student: Yep

SDM: So where do you live in relation to campus? Are you in the dorms or are you living off-campus?

PhD Student: Yes, I live off-campus now. My first year was on-campus but now I live off-campus. I live out by Alewife (end of the Red Line on the T). I ride the red lines. I am right where the T-station is, but I am kind of way out.

SDM: So what's your normal commute like and how was your normal commute like when you were living on-campus versus now?

PhD Student: When I was on-campus my first year, I lived in Ashdown, and so I would walk to campus, which I think would take approximately 15 to 20 minutes to get to the Stata building. That is where I was generally going at that time so fully outside and walking. Now, what I do, and this is obviously one of the concerns moving out there, but I will get to it. I'm actually very pleasantly happy with it. I live right where the T stop is, so I walk about two minutes and get on the T, and ride the T for about 20 minutes. Then in about 5 minutes, I'm on-campus. It takes me about 30 minutes door to door to get to my lab. So it's a longer commute but I spend most of that time sitting on the T. I tend to use that time as working time. So I actually feel like it's a little shorter, and I am inside the whole time so that's nice.

SDM: What's your typical day look like when you're on-campus?

PhD Student: Oh, well if only it were typical. I guess this where my GSC (Graduate Student Council) involvement makes things a little weird. I have a lot of meetings both in person and virtual, so it tends to change. On regular days when I'm not super busy, I tend to start working from home. I do my emails and everything in the mornings starting around 8:30/9. I do about an hour just emails and setting things up, making sure meetings are scheduled and everything. Then I generally head to campus around 10-10:30, and get on-campus around 11 because that's generally when my in-person meetings start. Then I'll stay on-campus until about six or seven.

SDM: So when you were living on-campus how did you get out? Were you in a place where they had a grocery store or anything like that? What did you do to go shopping or get out and about? What kind of other transportation did you use?

PhD Student: Yeah so this was one of the biggest motivators for moving off-campus. When I was living on-campus the nearest store was basically the Target near Central Station off the Red Line. My roommate and I would go there a lot. There was also the Whole Foods and Trader Joe's further down the river that we would go to, but that was a longer walk. So those tended to be our main places since we didn't have a car.

In contrast, where I live now, it's much more affordable to have a car so I have a car now. Right by where I live, about a 5-7 minute walk is a Whole Foods and a Trader Joes, so I can walk there if I want. But generally, like today, I drive about 2 minutes. I go to Whole Foods, get all my stuff, and then I can buy more groceries since I don't have to be as careful as when I was walking. Now I have more flexibility. Also with a car I can go to further places to many more real grocery stores that are full size, because we are more in a suburb area.

SDM: Did you ever use the bike network that they have on or near campus?

PhD Student: I have never actually used the blue bikes. Admittedly, I had missed out on that one but generally I just like walking. I am not a big bike person. I think it's nice to have that available.

SDM: And I'm just going to probe on that a little bit. What is the aversion to biking?

PhD Student: Yeah and it's not necessarily an aversion. Well, like many things I do in my work, I am pretty happy with the simplest things. With bikes I just never felt the necessary motivation to try it because I just generally like walking. The biggest issue I have with walking is when it's raining or snowing, and biking doesn't fix that for me. I haven't had an issue with distances, it's more just being outside for that long.

SDM: While you're walking do you spend time listening to audiobooks or podcasts or something?

PhD Student: I listen to a lot of podcasts. Yeah I almost always listen to podcasts while walking. I mean, even on my own, a lot of mornings, I try to go for about a 30 minute walk and listen to podcasts, but it is hard to do that with a busy schedule. That is what I would like to do. Which is another thing that I really like about being out in Alewife, there is a lot more nature walking trails, where campus is more dense/urban.

SDM: Yeah here there's a lot more walking trails around the river and also the Minuteman Trail is out there. So does your commute vary throughout the semester, or is it pretty stable, the entire time?

PhD Student: Well Covid has made it very unstable, so I feel as though it has now stabilized a little bit. I've lived in this apartment for 1 year and 3 months. The first semester, everything was virtual so there was no commute. It was nice being out there because it was much bigger and nicer for the price I was paying. Then in the spring, I had access, and came in once per week to grab hardware if needed. In summer, I started coming in three days a week since we were holding our lab meetings in person. And now I'm in almost every day and sometimes on the weekends due to classes and engagements. Personally, I have the unlimited T-card so I'm making good use of that.

SDM: Is there anything you would like to change about your current commute situation/strategy?

PhD Student: Personally I don't think there is anything I would like to change. I live very close to a T stop and MIT is very close to a T stop. I personally don't have to take a bus, but I was very strategic about that in taking my housing. Because I didn't really want to take a bus, and I didn't want to be so far away from a T stop that I had to walk a significant distance. I am happy how it all turned out. I was initially concerned about being so far away, but I think I don't feel like that after living out here. I actually feel closer to the city because I can get right on the T and ride it

straight into Boston. I feel, if anything, I am now connected to more stuff because of my closer proximity to the train at the end of the red line.

SDM: Having been on this campus comparing it to your undergrad campus. If you were coming to MIT as an undergrad, are there any discrepancies or ideas that you would be bringing from a transportation mindset based on your previous experiences?

PhD Student: MIT is so different from my undergrad, and I have slightly more loaded answers given my work at the GSC. At my undergraduate school transportation was a huge issue, but also Clemsen is a rural university. In the middle of basically the woods. The nearest city is about an hour away, and in an isolated environment. I think we're in a town that has a population of like 5000 or 6000 people and the university is 24,000 students so it's very much the university is our little town and we're about 30 minutes from the nearest major highway. Everything is self-contained there. What ends up happening is the students are much more spread out by distance. Housing was much cheaper, but unfortunately most students drove to campus, which was a very big logistical problem for parking lots and fitting all the cars near campus. I lived near campus and could walk. It was about a ten minute walk to my building. It also didn't get as cold which was nice. In Clemson, freshmen generally live in dorms (about 90%), and then for sophomores and above there is less than 10% living in dorms. At MIT conversely about 80% of undergraduates live on-campus and near 50% graduate students live on-campus. The advantage (at MIT) of having most of the population on-campus is that everyone can walk. So at Clemson, I don't think there were quite as many options for public transportation and the schedule for university buses was infrequent due to it being a rural area.

SDM: So I know you mentioned that unlimited T-card that you have. Is that anyway subsidized by MIT?

PhD Student: I love that you ask this one, because this is *one* of my GSC hot topics. I believe the T pass is 60% subsidized. I think it's $100 a month, if you don't have the subsidy and then I pay $40 a month. I could be totally wrong on these numbers but it's something I think like that. I believe faculty, staff, and postdocs get 100% paid. Graduate students, we just get the subsidy, and I would very much like them to be free. I know it wouldn't cost them that much because there's not too many students using it. I at least like it's subsidized. Otherwise I would be paying $4.80 per day. One day a week wasn't really worth it, because I would just spend just under $20 for the month, but now that I ride it every day it is very much worth it.

SDM: What were some of the *other* hot topics you mentioned from GSC?

PhD Student: That's a loaded question. *laughs* Oh, I have so many.

I'm the President of GSC so I have so many issues that we are trying to work on. So keeping it transportation related, T pass subsidizing is just a really simple thing that I feel as graduate students would be a nice benefit that wouldn't cost MIT much. I think that would be very nice

to have given that encouraging students to use the T and buses. I don't really ride the buses as much, but it is something I wish I learned more about. I didn't really know how to use the bus system. Especially like on MIT trying to go across from MIT to get over to the Fenway area, there is no T that goes directly there, but there is that bus that goes across the Harvard bridge straight there.

There are also some recent difficulties with parking. I know obviously there's a lot of parking on-campus and it's super expensive. But I've heard that a lot of students, particularly in Sloan, use cars for transportation and there've been challenges, because most of the student parking is way on the west side.

Recently I've also heard complaints about the MIT shuttles, but I've never ridden on them, so I don't know how to ride them. You basically find the app, and you get the times, but there have been inconsistencies because of how Covid has impacted the shuttle service. So, I wish it was more consistent.

SDM: So from the complaints that you heard from the students going from West campus to east campus, have they said that they would like something else besides the MIT channel, or are there other opportunities there?

PhD Student: So what I have heard is that one option is more frequent shuttles. Publication of shuttle routes and changes were not shown in app. Also students would prefer parking on east campus, but seems unlikely due to limited parking available.

SDM: What was your aversion to using buses/MIT shuttles?

PhD Student: I just never used them. I'll elaborate a little more. I didn't really know how to use them. The only time I wanted to use the bus is going across to Fenway, but I just never did it. I have since used the buses when there was rail construction, so I found out how easy it was. But since I'm so close to T, I have little reason to ride the bus. The only thing that is inconvenient is when I'm on-campus, trying to get across the river. I just don't know the MIT Shuttle schedules/locations. When I'm on-campus I just walk through tunnels so if we didn't have those, I might use the shuttles.

SDM: So, going back to your undergrad did you ever use the bus or shuttle system?

PhD Student: Yeah they had a shuttle system. I only used it when I was a freshman, and our parking was behind the football stadium. I had to move my car on the weekend, and they provided a shuttle for that. That was the only shuttle I rode. For the bus, I rode it one time with my friend from downtown to his place. I just preferred to walk. There was just not enough value to take the bus instead.

SDM: Do you use Uber or Lyft to get around sometimes?

PhD Student: Yes, I definitely use those. Less now than in the summer, when my girlfriend was back up here. When we would go into the city sometimes if we didn't want to take the T we would Uber. Coming back, the T only runs until 12:30 at night, so if we are out later than that, we have to take an Uber back.

I have also used Uber going to the airport. If it is just me by myself, I will use the T, but with my girlfriend we generally take an Uber to the airport. And then ride the T back. Especially because it's a lot cheaper because it's about $25 to go to the airport, but I really don't want to pay $70 to get out of the airport when I can take the T for free. I guess I take the silver line bus to get back from the airport.

SDM: When you want to leave the greater Boston area, what do you typically do?

PhD Student: Like I said I have my car. My girlfriend's house is outside the city, so I would drive to her if I'm really leaving the northeast. I basically use my car to drive around the northeast area generally. If I leave further than that, I just fly, so I pretty frequently go in and out of Logan. There are a lot of flight flexibility and options.

SDM: Have you ever taken the train further out like the commuter rail or Amtrak?

PhD Student: I've never really had a reason to take the commuter rail just because I don't live in the suburbs, and I can just drive.

I have considered the Amtrak, but I just really haven't had reasons to go to the places that it serves. Amtrak is really good at getting you to cities, but if I'm leaving the cities I'm generally going to do something where there is more nature. Plus I looked once and the price was comparable to the price of a flight and eight hours on an Amtrak versus an hour flight is not very comparable.

SDM: Well, I think we got the answers to the questions we were looking for. Thank you for taking your
time and we appreciate your perspective on this transportation around MIT in general and it's been a very insightful discussion, so thank you so much.

Member 08

Interviewee: John Doe (pseudonym)

Paraphrased Interview Summary (Refer to details within Transcript)

Q1. What is your role in the MIT Community/Background?
A1. Grad student at MIT currently within the 2nd year of the 2 year MBA program.

Q2. What does your typical day look like?
A2. School-wise, I travel from E30 to Harvard Business School and back to E62.

Q3. What is your favorite mode of transportation?
A3. I use the bicycle mostly.

Q4. How do you navigate the travel to HBS & back?
A4. I ride my own bicycle primarily and then I walk from the bike rack to my destination. Prior to this year, I would either walk or use a bluebike.

Q5. Did you encounter any problems in the winter in your mode of transportation?
A5. Yes. I would drive to Sloan (parking was free during COVID but now its $8/a day). I would then drive to HBS and pay a parking fee. Perhaps I will try to use a bike this winter but I am not sure how effective this would be. I

Q6. How much of your time per day on average would you say is spent on transportation?
A6. Approximately 15 mins to class, 15 mins to HBS, 15 mins to apartment, 30 back and forth to Sloan. Occasionally, 30 mins for groceries. (90 - 105 mins a day)

Q7. What is the most difficult thing do you face with the transportation system of your choice?
A7. Primarily riding during the rain, the traffic patterns at central square from a safety point of view, as well as riding during the snow.

Q8. Tell us what works well with riding your bicycle?
A8. As the distances are not far and hence, it would only take me 15 minutes or so from my apartment to Sloan using the bicycle which is a very reasonable time frame. I also like that it is a form of exercise.

Q9. What doesn't work well with riding your bicycle?
A9. Petty vandalism in Cambridge. Someone stole the pedals from my bike which forced me to find an alternate mode of transportation that day.

Q10. Did that occur on campus?
A10. No, it occurred in my apartment building.

Q11. How do you secure your bicycle?

A11. I use a mix of U-Locks and cables.

Q12. In what ways could your selected transportation system meet your needs better? For example, how could your travel to the grocery store be better?

A12. I haven't explored the T yet. I don't use the bicycle to go to the grocery store?

Q13. Why?
A13. The volume I carry is hard to load on a bike.

Q14. Are you staying on-campus or off-campus?
A14. Off-campus.

Q15. When you travel together with someone, what transportation method do you use?
A15. I travel with my wife using a car primarily as it allows us to be together. Sometimes we would use bicycles but we had a problem with Bluebikes.

Q16. What problem did you have with Bluebikes?
A16. The mismatch between supply and demand at peak hours as the bike station runs out. The bike offered is also heavy so it is not enjoyable to ride.

Q17. If you could add a new feature or service to your favorite mode of transportation, what would it look like?
A17. I would add additional places to lock the bike, or perhaps add locking docks similar to the ones offered by Bluebikes.

Q18. How would that change your experience with bicycles?
A18. It would reduce the friction with the exiting process. The bicycle locking/unlocking process can add 4-5 minutes to the total trip time which is substantial for short trips.

Q19. How would you prioritize this new feature or service compared with existing features or services?
A19. I would prioritize adding more spaces to lock the bike vs adding a locking dock due to its feasibility in the short term.

Q20. What should we be sure not to change?
A20. I would not change the dedicated bike lanes on Cambridge. They aren't perfect, but they provide space to ride until you are relatively safe. I prefer that these lanes aren't given a lesser priority over other lanes (e.g. bus lanes)

Q21. On a scale of one to 10, how happy are you with the transportation options in the area of MIT? Why?

A21. It is hard to provide an average. On nice weather days, I would be 100% happy with the modes of transportation as they offer reasonable transit times and exercise. I would have the exact opposite on bad weather days.

Q22. What would define a good or bad weather day for you, and what rating would you provide the transportation system for each?
A22. I'd consider 50f and above, as well as not raining to be a good day. I would give that a rank of 8/10. When it is 50f or less or it is raining, I would give that a rank of 2/10.

Q23. What other features would you like to add to your transportation system?
A23. I would like not having to use the bicycle. Perhaps an autonomous vehicle at a subsidized cost.

Q24. If you could come up with a new feature or you could create a mode of transportation that would meet your needs, what would you design and what would you add to it?

A23. I would focus on something automated that would have a dedicated right of way. It would be something like a trolly system ad a hyperloop – like a monorail. As an example, the San Francisco trolly system. It would be like a subway, but faster and more reliable and have its own right of way. Like a subway, but better.

Q24. What is sustainability to you?
A24. Reducing the amount of fossil fuels?

Q25. How would sustainability affect your decision on mode of transportation?
A25. It wouldn't really affect it much. I believe sustainability is important but I believe as individuals we are powerless. It would require society as a whole to adopt sustainability to make a difference.

Q26. What is your most favorite area on campus?
A26. The area directly in front of E62.

Q27. Which area do you frequent the most on campus?
A27. The Z-Center and one/two of the building on campus for recitation at Sloan.

Q28. What would you consider to be the entrance area of MIT?
A28. The Dome. It is the most recognizable feature of MIT.

Q29. Where do you believe most people come to campus from?
A29. My experience is limited to the business school. Mainly the main street entrance to Sloan which is not as enjoyable due to the construction works. It requires me to dismount before entering campus.

Q30. If you were given the option of driving an EV or sitting in an autonomous vehicle, which would you choose?
A30. I'd choose an EV. I do not feel comfortable with the level of technology in an autonomous vehicle yet. But perhaps something like a hybrid model. For example, the adaptive cruise control in Toyota. A system that helps but doesn't replace the driver.

Q31. What other insights do you have or would you suggest being included in such a vision?
A31. A closer integration of technologies that are easily available like parallel parking and sensors or cameras into the new system. More deployment of parallel parking to solve the car problem.

Q32. For a bicycle, do you see any value in conceiving some sort of pod system or autonomous bicycle/electrically powered bicycle?
A32. Yes. It would be most ideal if I could have a bike drive up to me and then go to the new customer, similar to a mini uber, which would take away the whole parking concern.

Detailed Transcript

Interviewer: Tell me a little bit about your background and your role in the MIT Community

John Doe: yeah, I'm a Grad student at MIT specifically. I am in the two-year full-time MBA program and I'm in my second year of that two-year Program.

Interviewer: awesome and you've lived on campus or lived in the MIT area since I guess starting that Program.

John Doe: yeah that's right, so I moved to Cambridge in August of 2020 and I live off campus. I live near central square I guess the neighborhoods actually called Cambridgeport.

Interviewer: That's awesome. So, what does your typical day look like? Describe a day in the life of Mr. John Doe.

John Doe: yeah so, I'll describe like my typical Monday. So that's tomorrow, I have class at Sloan at 830 followed by class at 1030 at HBS. And then class at 230 at Sloan so I have to go from my apartment to Sloan and then from Sloan across the river to HBS, come back for lunch, and then I have to go from my house to Sloan and then eventually go back to my apartment, so it is a lot of travel.

Interviewer: Great that's incredible. I tried to take an HBS class and determined that what you do is too difficult to do and then gave up.
So, tell us how you navigate that journey?

John Doe: yeah so currently I ride my bicycle so I have a bike dock at my apartment building. I ride over to Sloan, lock it up there and then ride over to HBS, lock it up there, and so on, but I've only recently got the bike so before that I was either walking or taking a blue bike.

Interviewer: Great. Congrats on upgrading from blue bike to your own bike. You were here for the winter; did you encounter any issues in the winter with your choice of transportation?

John Doe: yeah definitely the winter was tough, before I had a bike. Last semester during the winter I would try to drive to Sloan because it was so cold and that wasn't really a problem because parking at Sloan was free.
This semester, when I think it's like $8 a day to park at Sloan. So, I haven't decided if I'm going to suck it up and ride my bike or drive and pay the parking. I'm probably going to ride my bike.

Interviewer: And then would you drive to HBS and did you have to pay the pocket HBS as well?

John Doe: yeah, I guess I hadn't even thought about that, so I would have to pay to parking fees, which probably leans me towards just putting on extra layers - two hats and gloves - and ride my bike. Although, if it's snowing I don't really know what I would do.

Interviewer: yeah that is going to be a predicament that hopefully doesn't happen, too often, but yes, I, I find myself in that same in that same boat, I ride my bike and I'm terrified of the snow, so we shall see.

What can you characterize that works well with using your bicycle as your primary mode of transportation and what maybe does not work well with using your bicycle?

John Doe: yeah, I think what works well, is that the distances that I have to actually bike to are not too far, so it takes me from the time I leave my apartment I'm off my bike and drive over to Sloan less, but you know 15 minutes or so never more than 15 minutes so it's like a very reasonable time.

John Doe: I think what doesn't work well is there's a lot of. I would guess call it petty vandalism in Cambridge so, for example, I went downstairs two weeks ago to ride my bike over to campus and somebody had stolen the pedals off of my bike so I was forced to figure out an alternate mode of transportation on short notice. They had stolen the pedals even though you know there's like a bright light on the bike rack and into security cameras, so they had taken a tool right you can't just unscrew the pedals you have to use a wrench. They used a wrench to take the pedals under a bright light and a security camera so even some deterrent measures didn't stop them.
They were run of the mill plastic completely inconspicuous by pedals.

Interviewer: yeah well that's obviously a big problem. Is anything else that kind of stands out to you in terms of problems with using your bike?

John Doe: yeah definitely the weather, I think, is the next biggest thing, aside from the cold. Riding a bike in the rain is not pleasant and I think also aside, aside from the rain, the traffic patterns, particularly around central square are bad in a lot of ways. The drivers on Massachusetts avenue are somewhat erratic so it's not necessarily the safest mode of transportation, at least in that core of central Square.

Interviewer: Just one thing, if I can. How much of your day, on average, would you spend on transportation so that's my bike, walking, even using the car?

John Doe: 15 minutes like on a Monday 15 minutes to class. 15 minutes back so that's 30 and then 15 minutes to my apartment 45 and then another 30 to get back and forth so like 75 minutes a day on a Monday and Wednesday and then I'd probably say maybe like 40 minutes, a day on Tuesday Thursday so like your average weekday.

John Doe: average, maybe close to an hour.

Interviewer: what about the other things that you use transport for?

John Doe: yeah so driving like to the grocery store, even though it's a very short distance. Because of the congestion would take you know at least 15 minutes and I do that at least once a week, so another half hour or so there.

John Doe: I don't really drive my car around Cambridge unless it's going to the grocery store like trader joe's.

Interviewer: The next group of questions is about kind of different ways that you currently use the transportation system and how it might be better so, in what ways could your transportation system meet your needs better?

John Doe: You know it's hard to say because I haven't explored the T or, like some of the MIT shuttles, but I just kind of use the bike because I view it as the most convenient method of transportation. I'm not really too sure like how could be improved in the short term because, like the you know the population at Cambridge I think it's large relative to the infrastructure, like the roads themselves.

Interviewer: So, tell us about why you don't use your bike to go to the grocery store.

John Doe: yeah, I think when I go to the grocery store it's usually like a weekly trip so we'll stock up on groceries for the week so it's just some of the things are like hard to carry out like, for example, like milk, seltzer if we pick up like a six pack of beer or a bottle of wine. Those liquids, I think, are especially difficult to carry plus any sort of bulk items you get like you know boxes of cereal or whatever like we walk out of the grocery store over say three or four bags, so it would just be like too much to care, even if I had a basket.

Interviewer: It sounds like using the word “we”, I'm guessing you go with someone.

John Doe: My when my wife and I are traveling together we typically drive just because you'd have to either have like my own bike and then we'd have to rent a blue bike and all the hassles that come with the blue bikes or you know we'd have to walk so we use the car when it's you know multiple people traveling.

Interviewer: Yes, tell me more about the hassles that you've had with the blue bikes.

John Doe: yeah so I was using blue bikes to get back and forth to campus before I got my bike recently, and I think the main hassles are the mismatch between supply and demand at peak hours so, for example by 830 class on Mondays I knew I’d have to arrive to the bike station or the dock around like 8am because if I showed up at 810 or 815 the bike stations would be full so I’d have to like a plan time my arrival, so the crowd at the docking stations wasn’t bad.

John Doe: Similarly, in reverse if I leave Sloan too late, I would have to walk because there wouldn't be any bikes available around Sloan or there'd be no spots near my apartment.

John Doe: A lot of the other issues are with the blue bikes themselves. They’re really heavy so it’s not an enjoyable ride. Also, sometimes there'll be three or four bikes in the dock, but the red button indicating that the bike requires maintenance will be would be pressed or some of the docking stations themselves are broken so it's sort of like a maintenance issue as well.

Interviewer: Do you use a lock do you use a U-lock?

John Doe: yeah, I use a u lock, along with a cable and before I bought the lock did decent amount of research to find out or to pay extra for a lock that you couldn't break easily because of the vandalism problem.

Interviewer: And so, you just use a u-lock, and you lock up the back wheel then?

John Doe: yeah, I lock up the front wheel and then I string a cable through the back wheel and attach it to the to the lock so like a huge lock and cable combination.

Interviewer: so sufficient to say that security of your bike is of paramount importance, based on where you live and the theft and vandalism issues that you might have to encounter.

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John Doe: yeah that's right, but I think the downside of that I require a backpack to store the lock while transport it. So, like, for example, if I'm going over to a friend's house, I might not want to bring a backpack but I pretty much have to otherwise I’ll walk and keep my hands free.

Interviewer: So, do you go to anywhere else on campus is it mainly Sloan and HBS and home, do you have any other places that you frequent?

John Doe: Well, I go to the Z center for the gym and then I go to one other buildings on campus, two or three times a month for recitation.

Interviewer: Alright, so if you could add a new feature or service to your favorite mode of transportation What would it look like?

John Doe: What I would benefit from the most would be just additional places to lock your bike.

John Doe: So, for example, I go to the Z Center.

John Doe: Often there's just not enough spots to park your bike so you have to like Jerry rig it in between three other bikes and make sure you don't lock up someone else's bike when you're locking up yours by accident. And then, like if I'm going to like target or 711 there's just not a whole lot of places to lock your bikes I find like sometimes if I'm making a quick trip like I'll lock it up to a street post or something random just because there's no actual like dedicated bike racks.

Interviewer: so, to change your experience with bicycling, there would be more places to lock your bike and that would make it an easier experience

John Doe: I think it would just reduce the friction associated with exiting my mode of transportation, because now, when I have completed my trip, I have to go through this process of finding a suitable place to lock my bike which sometimes can add four or five minutes to my total trip time. Which might not sound like a lot but relative to a trip of 10 minutes you know that's like maybe a third or more of the total time is spent just locking my bike. So being able to reduce that time just make it easier to transition from transportation to you know, whatever activity I'm planning to conduct.

Interviewer: Do you also struggle with that on the front end when you go to unlock your bike do you feel like it takes a long time to unlock your bike?

John Doe: yeah, I characterize it as mildly frustrating, because I have to make sure I bring a backpack and then I have the process down where I kind of like have a routine. I place my backpack down I open it up, I find a key, I unlock my bike, I put the lock in my backpack and then I can actually begin riding so it definitely takes like you know, two minutes.

Interviewer: The next question is about prioritizing this new feature, of having more bike racks. How would you prioritize this new feature compared with existing features?

John Doe: Talking through this I think has sparked maybe a little creativity.

John Doe: You know the problem I'm trying to solve is locking and unlocking my bike and the blue bikes have a docking feature, so if I could eliminate my lock all together and engage my bike in a system that was secure that would allow me to no longer have to use my own lock, but I think one of the downsides would be the availability of this feature.

Interviewer: So, would you prioritize places to lock your bike or the technology to have a lockless system?

John Doe: I probably prioritize the additional spaces to lock my bike because it definitely seems feasible in the short term.

John Doe: Also, if we're thinking about it in the context of like MIT, having like a key fob where I could you know badge into a room, place my bike and then there would be like maybe a security camera to provide a level of deterrence, without having to have somebody watching it all the time. That would be a creative way to get around at least one half of the lock problem.

Interviewer: So, the next question is what: What should we not change about the bike system? What should we not change about how the bikes work and your interaction with this mode of transportation?

John Doe: I'm not really sure like what you could change to make it worse.

John Doe: Okay, I guess what you should definitely not change is the lack of dedicated bike lanes in Cambridge. While they're not perfect, they do provide at least like a space in which you can ride and feel relatively safe so I wouldn't want to change that yeah.

Interviewer: So, on a scale of 1 to 10, kind of more generally now, how happy are you with transportation options in the area of MIT?

John Doe: You know, it's kind of hard to provide an average, I would say that, like my experiences really depend. On nice weather days, I'm 100% happy with the situation because I get to get outside. Do a little exercise. By riding a bike, I get to where I'm going in a very reasonable timeframe, so my experience on good whether days is truly high, but my experience on bad
whether days is the exact opposite. So, like, I guess I'm medium happy. But that medium average doesn't really characterize my experience.

Interviewer: That makes sense, so you know the other options that you have on campus like the buses, T, etc. outside of biking. Those also don't meet your needs, even when it is bad weather is kind of what you're saying right.

John Doe: Yeah. I think that's right because, even on bad weather days to get to the T, I would have to walk outside in bad weather, and similarly with the buses, I think a big downside of the

buses is that because They don't have their own dedicated right away like the T does, they're subject to the variability associated with traffic. So, if a bus is running late, you could still get to the bus station at the scheduled time but you're going to be outside you know with some undetermined amount of time until you get on. It's just slower.

Interviewer: Just a few follow ups here. What would you characterize as a nice weather day?

John Doe: Yeah, I would say I would characterize a nice weather day is like above 50 degrees and not raining.

Interviewer: Perfect okay, so on those nice weather days, how would you rate the transportation options that you have?

John Doe: Eight.

Interviewer: Okay, and on 50 degrees and below and raining.

John Doe: On the bad weather days, there really is no good option. I don’t know how to rate it, because there are options available, but I can get where I'm going but it's going to be an unideal experience, no matter what method of transportation.

Interviewer: So, we can ask something similar So if you don't have a, you know, a differentiating answer that's no problem, but what features, would you like to have in your favorite mode of transportation?

And you can kind of think pie in the sky, here we sort of already have, but can we can you think of any other features you'd love to have in your bicycle system in your bicycle transportation.

John Doe: Yeah, I guess like ideally, a guy would not have to be able to ride a bike at all so like an autonomous vehicle that picks me up on demand at a subsidized cost would be my pie in the sky, but I think just improving the traffic flow specifically around central square because you have people that illegally park temporarily in the bike lanes, which causes me to have to ride in the vehicle lanes and dodge traffic on Massachusetts Avenue. I think it's like my biggest hang up.

Interviewer: Perhaps some way for those people who do not be in the bike lane would improve your overall experience right.

John Doe: Yeah like, for example, there are streets that run parallel Massachusetts Ave. My experience on those side streets is that, while there's less traffic there isn't a dedicated bike lane, and in that case, you have to just be super alert as to the traffic that's around so. I don't necessarily need to take Massachusetts Ave. I can take one of the side streets that runs in the same direction, parallel to it, but there are no dedicated bike lanes on those smaller roles.

Interviewer: Yeah, no that's perfect thanks a lot so let's go bigger picture again very general here. What is sustainability to you?

John Doe: I think, sustainability, to me, is reducing the amount of fossil fuels that are required to transport people.

Interviewer: Yeah, that's awesome, and how has that affected your decision on your mode of transportation? Your definition of sustainability or your passion for sustainability, does that factor into to how you choose to get around?

John Doe: Not really. I ride my bike, because it's the most efficient way to get from where I am and where I need to be, but I don't think that driving a car over such short distances has any material impact on the overall transportation system because of how frequently I do it.

Interviewer: So, so you mentioned earlier, an autonomous vehicle maybe comes picks you up, and you know pie in the sky, in a perfect world, that autonomous vehicle, if it was a Hummer and obviously gas guzzler you know super charged or whatever versus an electric vehicle. Would that change your decision to say: I'm going to ride my bike instead of taking the Hummer, or are you going to take the Hummer, because it's a cold weather day or a bad weather day and you need to get from class without class getting soaked.

John Doe: Yeah, I mean that's like a difficult example because I think it's maybe somewhat contrived, I suppose, but like I guess if you would force me to choose between an efficient mode of transportation or riding my bike, I would likely choose the inefficient mode of transportation just given the inconvenience associated with traveling you know, on foot or off by such poor weather.

Interviewer: I'm just have a quick follow up on my end. How important is sustainability? Is this one of the concepts that are key to you or doesn't really matter?

John Doe: It is a difficult question. Sustainability is important to me, but I think in a lot of ways it's out of my scope of influence, because I can make decisions on an individual level, but unless society as a whole interface in very material ways, my decisions are not going to have any impact on their trajectory of global warming, or you know, sustainability, so I feel relatively powerless as an individual to change any aggregate outcomes in a material way.

Interviewer: Back to campus. We talked about places you frequent. Do you have a favorite area on campus?

John Doe: Yeah, I think. I definitely like when it comes to parking my bike, I always park directly in front of 60 to start near the elevators by the parking garage.

I can talk about personally where I like to you know study room across from the class but that's probably outside the scope of this interview.

Interviewer: Good so, is it fair to say that 62 is your most favorite spot on campus?

John Doe: Yeah, I think so. It's like where most of the Sloan and student body hangs out. So, it's like a lot of social components. All the classes are in the study room.

Interviewer: This is an interesting question, because we are looking at sort of rebranding Kendall as the new entrance to MIT. Do you think MIT currently has an entrance? If someone asks you, “hey where is the entrance”, how would you answer a question to a tourist to might have asked you that?

John Doe: I would point them to the Dome, because I think that's like the most recognizable feature, but I think out to your point there's MIT spread out. Around Kendall and I guess Cambridge as well, so there really is no, like aside from the Dome, which I call it, the heart of campus there really isn’t. It like it's very spread out.

Interviewer: So now you're a student and not a tourist, most people are coming to campus through a certain corridor or via certain kind of set of buildings or geographical location.

John Doe: Yeah, I think my experiences mostly limited to Business School but definitely that mainstream entrance to Sloan which right now is like not an enjoyable experience to go into, because of all the construction, both on Main Street. So, it's like when I'm riding my bike, I usually have to dismount to not ride my bike into people.

Interviewer: Okay, so yeah, so you're referring to the Main Street intersection where just before it goes kind of runs into Broadway and goes across the Longfellow Bridge. Is that correct?

John Doe: That's right. Yeah, that's it.

Interviewer: If you are building and designing your own transportation system, how do you think technology could/should fit in with that?

John Doe: If I were designing a transportation system from scratch with the tools currently available, what I would focus on is this: right of ways for automated vehicles. So, like what I mean it's like in San Francisco they have the trolley system above ground, and I think like not necessarily a trolley system, but somewhere between trolley system and hyperloop like a vehicle almost like when you're getting to the airport, and they have the sort of like s monorail. Say I wanted to get from one end of Mass. Ave. to the other on a monorail that can just take me that mile. Sort of like a subway, but just faster. More reliable, and it has its own right away.

Interviewer: And then, so that would be the technology that you would kind of implement is some sort of maybe automated monorail kind of system people mover system, if you will?

John Doe: Yep. Yeah, like a subway but better.

Interviewer: All right, if you were given the option of driving in an electric vehicle or sitting in on autonomous vehicle which would you choose?

John Doe: Like today I would choose an electric vehicle, because I just don't feel comfortable with the level of technology and automated vehicles to feel comfortable you know, putting my safety in our hands, but I think like I'm like a hybrid sort of model or expressed where like right now I'm driving my Toyota Camry on cruise control, but cruise control is adaptive. So, it slows down if the car in front of me slows down, so there are some safety mechanisms built in to complement the driver, but they don't replace the driver.

Interviewer: All right, and then sort of the last question in this vision that you've just kind of talked about, this monorail people mover maybe semi- or semi-semi-autonomous vehicle, do you have any other insights or any other set suggestions for that vision? If again, pie in the sky, you could do whatever you wanted, what would you design and what other elements, would you add to it?

John Doe: Like as I'm driving my car right now, which I guess you could classify as semi-autonomous. It's just not outfitted with enough sensors. Like when I'm backing into a parking spot, I still have to engage my rear view inside the mirrors but there's no reason that I can't have a full 360 degree view through additional cameras, so I think a closer integration of the technology that's cheap and available like sensors would be hugely beneficial and then just additional features like parallel parking that is a feature that should be readily available, because cars can manage their space and stay in lanes. When there's no moving objects and I'm parking into a spot I think a car, should be able to take over some of these tedious tasks that I believe they're fully capable of doing, but they just aren't you know they're either premium features or they're just not available in both models.

Interviewer: One other thought just occurred to me on the bicycle. So, we've talked a lot about bicycles, we kind of switched to this kind of visionary what it might look like or how we could use technology better to design a transportation system for a bicycle. Do you see any value in having an autonomous bicycle or some sort of pod system?

Would you think you would benefit from an electrically powered bicycle that you didn't have to ride, or would that still not offer to get the kind of value that you're looking for in maybe a cold weather transportation system?

John Doe: I mean, I think, like pie in the sky, having a bike drive up to me, and then I could take it, where I needed to go, and then it would drive off to the next customer would be like a mini-Uber. Which would be which would be sick, and I wouldn't have to worry about locking it up. I think, to power, it would be a lot cheaper and less expensive than powering an entire automated vehicle so like just a little automated bike driving around, and then you drive them wherever you want. They just go off and find the next customer. Feels pretty futuristic, of course.

Member 09

Interviewer: I'm from the SDM program and we have an assignment to design a transportation system that's going to connect the MIT campus with adjacent areas of Kendall Square. Part of what we want to do in this phase one for this assignment is to understand the needs of students and potential stakeholders that are around the Kendall/MIT area and see how this transportation system would help them and fulfill the needs that the current transportation system does not currently do. I would like to know first at what capacity you are involved in the MIT community. I know you're a student, but about your workload, how many times a week you go to campus? Can you tell me a little bit about that?
Student: Yep. So I work at The Engine, which is located in Central Square and I commute to the MIT campus maybe three or four times a week, typically three, because I go to school twice a week. And then there's a third day where I just go for COVID checkups. And yeah, what was the rest of the question?
***Interviewer*:** So, you're a part time student, essentially. How do the days that you typically go to campus look like? Do you go to work first? And then go to school over lunch? Or do you go to school and stay there the whole day? How does that look like?
Student: No, I typically go there and then come back. My classes go from 1 to 2:30. So I'll leave for lunch, have lunch, then head to class and then walk back. And luckily, my class is on the Mass Ave side of campus. Because for me, the most problematic thing is when I must go to the business school side of campus or where SDM is at, because that's no longer a nice and quick walk. Now that that gets the round trip goes from instead of being 20 minutes, it goes to like, almost 45 minutes to an hour.
Interviewer: So you usually walk to campus from The Engine. And that takes you said?
Student: Oh, that's quick. From here to the classroom, it is like 10 minutes.
Interviewer: Okay, so you've been a student for more than a year. How does your commute look like during the whole year? Is it the same in winter? Do you also commute by walking? Or do you take transportation for that?
Student: If I had to still go through the same commute I go through today, I would still walk primarily. The Kendall square T stop is pretty far from where I'm going to campus. So I would still have to walk. There's no easier way. And the trouble of biking there is to try and find a place to leave the bike and the snow. It is still not worth it. So I still see myself walking there. It will definitely change. I'll be miserable. Right now, it's pretty nice. But I don't really have an alternative.
Well, there's one thing: I have the option of doing it online. It's a hybrid environment. So if it's terribly cold outside, I will most likely resort to that.
Interviewer: Okay. All right. And that's to get to your classroom for this particular class, right? Do you ever go to Kendall Square surrounding areas for social events related to MIT? How does that look like when you're getting there?
Student: Yes, for me, Kendall Square and this side of campus, let's call it like the gym, the student center, the west side by side they're completely different. Like once you tell me “Oh, we're going to Kendall” I decide I need to take the T, because it's a big difference. In my experience.
Interviewer: You're going to different places, essentially. Speaking more about your current means to get there which is walking: Do you think this satisfies all your current needs? How would

that be different during the wintertime? And you mentioned it's the best option regardless. Right? But do you think in an ideal world this would be something that you would choose? Regardless of if there was another transportation option available?
Student: To be honest, I'll still probably walk. I don't, I feel like my classroom could be any closer to my job. I got really lucky with that. But the minute you start extending that a little bit further, like if it was, for example, the Koch Institute, I would be on the fence, like, I don't know if I would walk there, I might try to bike there. There's something about a 20-minute round trip. That, to me is like it's under a half an hour, right? Like, I manage my work schedule in half an hour blocks. So if it's less than half an hour for me, it's like, okay, there's no reason to change that. Like, if I make it 15 minutes, it's not going to change my day. But now, if we have a class at the Koch Institute for example, it's not 20 minutes, it is going to be 40 minutes, maybe more. Yeah, I do want those 20 minutes back.
Interviewer: Was there ever a scenario before in previous semesters that you have to commute within campus? Like, say you have two classes and one class was here, and the other one was there and you had to rush to get there?
Student: No, it was all remote. Yeah, it was the middle of the pandemic.
Interviewer: Oh, right. What about the MIT shuttles? Have you ever tried the shuttles that MIT provides? Or have you experienced that?
Student: I've tried this thing, man, what was the name of it, but it connects you to Charlestown, basically. And that one, I thought was awesome. Because you just hop on it, it takes you and it makes it a 45 minutes to one hour walk in 15 minutes. So I thought that was great. What was the name of it? I can't remember. I don't know that it was like the typical MIT shuttle. It's something else I believe. But that that's super, super helpful. I can see how people that work in Central Square or at MIT would take that to their apartments, you know, be it in Charlestown or towards the Museum of Science, or that entire area, it connects it super nicely.
Interviewer: What do you like about that service? Besides that it is fast? Do you find that it's reliable? How are the schedules? I mean, granted, you maybe took it once, or twice, but first impressions besides “Oh, this is nice”
Student: What I like is not that it was free. One of my biggest pet peeves with public transport is not paying for it, it is how. For example, in buses, they don't have a card reload option. So you have to have cash round, and I never, ever, ever have cash on me. Never. So I like that it was free in that case, because if I needed cash, I probably wouldn't have been able to take it. I think for me is the ability to hop on it real quick without having to do much. It's super advantageous. In the winter, I think what changes most is that if it's going to be there at 5:00, it better be there between 4:55 and 5:05. Other than that, it gets pretty bad.
Interviewer: So you mentioned something you liked was that is was free. And I want to explore that a little bit more.
Student: Well, I liked that I didn't have to worry about paying. Not necessarily that it was free, but it was convenient. Just think about potentially having to return ATM to get money out simply because the bus system requires you to pay either with a pre-loaded card or with cash. Yeah, that's kind of annoying.
Interviewer: All right, and we talked about how this may change in the wintertime, you mentioned the schedules. Anything else that you can think of? I feel we live in a city that changes a lot. And things look very different, right? As Seasons come and go… And transportation, of

course, is one of these. Are there any other nice-to-have things that you can think of specially during the wintertime? I think people often have a lot of opinions on how to commute depending on which season we are in, right?

Student: Yeah, um, well, this is tricky. And, you know, back in undergrad, I was fully dependent on public transport 100%, dependent on public transport. And I didn't think of it much primarily because the frequency in which the bus would come and pick you up was so high, that it was almost never an issue. But it was in an area that was as densely populated as the Kendall MIT area. That being said, when the winter comes, bikes are sort of out of the window, you're not going to bike anywhere, you're not going to use scooters, the snow really becomes a major challenge. So I think that having a schedule that maybe increases in frequency, just knowing that the number of people that will make use of it will change. So adapting to that demand would be useful.

I think when you look at systems like the Silver Line, for example, they have the preferred right of way. So they don't encounter as much traffic. And quite frankly, I've taken it. I mean, it's not that different from taking the T. The only difference is that you don't see the rails. So if you're into that, well, there's no rails. But now the shuttle is serving a higher number of students, and you don't have right of way because you're having to deal with the traffic. And remember, there's a lot of people that are going to come into work into the Kendall Square/MIT and Central Square areas. They're also not going to be biking. So now they're going to resource to their cars and they're going to drive in. I feel like that's where MIT having some sort of advantage on the road would make the service just better.

Interviewer: The demand for sure increases if people are not biking as much and people are maybe more willing to opt for one of the transportation systems that the university supports, right? You mentioned at some point during our talk about a bike… Do you own a bike?

I know your commute to MIT is kind of different because you're very lucky that you work very close to the university, and you can walk but I'm interested then in knowing about your use of transportation in general. How does that look like for you? For example, when it's time to park the bike, what are your parking needs?

Student: My biggest concern with biking is quite frankly how often they get stolen. I've heard enough horror stories to never leave my bike overnight anywhere. You know, and my bike is not a fancy bike by any means. But a lot of people own bikes that they won't just use for commuting, but they will use them for other substitute, like just getting around the weekends and that sort of thing. So they tend to go to a nicer bike. And you know, those things are expensive. So my general experience: I just almost never leave it outside locked, which is not ideal for people were like commuting quite frequently, but I don't use it for commuting. So that's my case. And I've heard that finding spots for Blue Bikes can be challenging as well. But honestly, people that are like some of my friends that use those, they don't talk about that a whole lot.

Interviewer: So maybe it's not a big issue?

Student: I don't think so. I think sometimes when you have just the one issue, it gets overblown. You know, it's like "oh, like this feature on the phone kind of sucks." Well, yeah, it's like the one thing that doesn't work. And people tend to focus their attention on that quite a bit and over-emphasize the problem when maybe it's not that big of an issue. Like if you average how many hours is saving you and the cost efficiency of it and all this stuff you come to realize It's like, maybe a weak point. But in general, it's a very strong offer.

Interviewer: I also have a question about considering lower carbon options, with a trade-off for either a longer commute time or higher prices. Actually, let's talk about budgeting for transportation. How much do you think, I guess percentage wise, you would be willing to allocating in good transportation?
Student: Well, so you think about T fares, I would be able to pay more than that. I wouldn't want to pay more than that for sure. Especially if this is serving like MIT students and faculty and administrators. It should be subsidized by MIT. You can't make students pay more than what they already paid for the T. So that to me is the ceiling.
Interviewer: Okay, what about options with lower carbon emissions, sustainable energy, and autonomous driving? These are things we're also considering. Do you think it would be worth it to allocate more of this budget if the transportation system supports any of these features?
Student: Well, yeah. I think that we're not too far away from a world where there is potentially a carbon tax, for example. So if you're going to start a transportation system, this is going to get taxed in like 5 to 10 years. You might be wasting resources, because you might have to do a lot of re-work down the road. Beyond that, MIT is a leading Technological Institute, and I would expect better. I would expect not only for transportation to be very energy efficient, but also to set the tone for any other Institute. Any other college that is setting up their own transportation systems.
And there was a question about autonomous driving. I don't have any strong feelings on that one. I don't think you're solving any problems for students, whether it's autonomous or not. It's just a staffing issue. That's more on the economics. If the system is going to be up and running until 2am, then you're just going to have to pay overtime or, you're going to have to pay extra for the driver. Unfortunately, autonomous driving on last mile transportation is not quite there just yet specially for like, the Kendall Square area, that's going to be very, very congested.
Interviewer: Yes. A lot of traffic. A lot of stuff going on. Speaking of the current transportation system, and again, I feel that we can look at this more in general transportation, not necessarily around the MIT/Kendall area, do you think there could be better incentives to make people rely more on the public transportation system that we currently have? Do you think this could be in terms of prices? or is there anything else you can think of that could make public transportation more attractive?
Student: I think there's a lot of stuff that MIT, the City of Cambridge, the State of Massachusetts, could be doing. You know, make it more expensive somehow to drive your car, if it's just you in the car. When you get on a bus, the footprint of the bus is about maybe, let's say, I have no idea, but let's say four times the footprint of a car, and you're fitting maybe 10x the number of people per square foot. So, I think there should be incentives to try and minimize just single driver vehicles in the road specially heavily, or very densely populated areas like in Kendall Square.
That's, it's a very loaded question on how you turn people from using a car versus using public transport. What did it for me, quite frankly, was parking. Dealing with parking and Central Square is nothing short of a nightmare. And honestly, just leaving my place 20 minutes earlier, and getting home 20 minutes later was totally worth it. Continue to make parking harder, charge more for the meters, reduce the number of parking lots and make them maybe make use of that space towards something that is friendlier to pedestrians.

Interviewer: To close, what else would you like to see in public transportation in general? If the transportation was better, perhaps, would you be involved in more activities in the MIT/Kendall Square area?

Student: It's possible. It's possible. I think it's one of those things that I haven't connected the two dots. I think in general, when I see something like "oh, there's some talk at E40 tomorrow at 6:30" I immediately default to no. I would like to go but that's going to take an hour of my day, simply by getting there and coming back. So, it's hard to tell. There's something the T started doing lately, where they have these people that are just literally there just walking around and helping you.

Interviewer: The people in red?

Student: Yeah, exactly. I love those guys. And gals. In the sense of it changes the feeling of taking public transport from a last resort to something where there's a server. There's like a butler. It really changes the feeling of it. And it's happened to me that I'm on a crunch and my ticket wasn't working. And they come, they take a look at the ticket, they have a conversation with you, and they stare at you, you know one way or the other. But you don't feel like you're on your own like it's the Wild Wild West. There's somebody there not just keeping an eye on what you should be doing. But there's somebody there like legitimately trying to help you. And they'll approach you with that which I thought was super interesting. They tell you exactly what they're there for. I've taken public transport all my life. I've never seen that ever. And it was incredibly refreshing.

What has happened to me too is that there's like a door that's permanently open for whatever reason, they might be fixing it or whatnot. And they'll tell you just go through it. "Don't worry about it." Having somebody that is taking care of those things, as silly as it sounds, makes your experience much smoother. Even if there was absolutely nobody there, the fact that the person working for the T told me to go through it the broken door, makes me feel not guilty. And I can see how in college, it would have been nice to have somebody who was dedicated to doing that.

Interviewer: It's not only the fact that they are very helpful, but also maybe the friendliness?

Student: Definitely the friendliness, no doubt about it. I mean, I cannot tell you how many times in college I wanted to get somewhere, and I wasn't sure. There was no way I was going to stand next to a driver and like, talk to him as he's driving and asking him. It just felt weird, especially if the bus is packed and you maybe entered through the back door. But as I was waiting, there was nobody there. And I could maybe see how in the winter that could be challenging, for sure. But as of now, I would consider that a success for public transport in Boston.

Member 10

Interview guideline link: here.
Interviewee: Ph.D. Student, Operations Research at MIT

1. **Briefly, what do you do on a day-to-day basis? (What does a typical day in your life look like) (Building rapport to set context for her to use public transportation to: is it for work, school, grocery shopping, hanging out?)**

She is a PhD student at MIT. She went to undergraduate at MIT so she has been staying in the Cambridge area for a couple of years now. A typical day in her life: she usually departs at 10 AM to go to her office, then goes back to her apartment to have lunch. "It is pretty boring," she said, jokingly. She lives in an apartment in Kendall Square and sometimes she goes to the library or to shop for groceries.

2. **What are the surface transportation tools in the MIT campus area you are aware of?**

She is aware of the presence of blue bikes, T-subway, scooters, MIT shuttle. She previously used the MIT shuttle when she lived in the dorm on campus, but now she lives in an apartment in Kendall Square, she rarely uses that shuttle service because it rarely passes her area now. She has an electric scooter, but rarely uses it now as she prefers walking if it is within a short distance under 20 minutes.

3. **Which ones do you typically use and why?**

If it is less than 20 minutes, she would prefer walking or using her electric scooter. She likes the electric scooter because she can just go anywhere without manually paddling the bike. If it is more than 20 minutes she will prefer using the T subway, not scooter because she does not know about the parking restrictions for her scooter if it is far and in an unfamiliar place.

4. **Does this change between normal days vs. big events, weekdays vs. weekend, time of the day, the origin and destination, the type of activity you have, the attire you wear of the day and how?**

During the weekend she goes out to Cambridge and Boston more often where she uses T transportation. She rarely uses a scooter or walks when it is cold like in the winter because it is cold to ride one. There are no significant changes in terms of the attire. In terms of the route, she thinks that the T subway already facilitated her going around Kendall and particularly outside to Cambridge.

5. **What do you think about the time, the schedule, the stops, fare and pass price for public transportation tools?**

She believes the price for the subway is relatively OK as it is within a decent and reasonable budget, but the schedule for the T subway is not punctual. They can be late for more than 7

minutes, oftentimes it is different from the predicted schedule in google maps. For a scooter, it has a relatively good price since it is free for parking, she just thinks that there is no designated parking place for her scooter just like bluebikes.

6. **On a scale of one to 10, how happy are you with Kendall MIT's transportation (to/from/and within) the area in terms of convenience (the time, schedule, stops)? Why did you give that score?**

6, because the T-subway is not punctual and the neighborhood already felt safe. However, for traveling outside of the Cambridge and Boston area context, the choice of routes and safety is already convenient for her. It is just that to reach different parts of MIT if she is not riding her electric scooter she will need to walk far.

7. **For bikes, skates, skateboards, what is the road condition and are they convenient to use here and how do other people perceive this?**

There is too much construction in the Kendall area that took a lot of the bike lanes (that will include the electric scooter). The electric scooter does not have a designated parking area like bluebikes.

8. **For cars, motorcycles and bikes, what are the parking options? What do the safety conditions and the cost look like?**

For her, a car is very expensive in terms of parking and parking is very hard. It is not necessary to have one when everything is just close and nearby in Kendall, especially when mostly she spends her time everyday around the area. She believes she can already get anywhere around campus by walking even when it is far, as long as it is below a 20 minutes walk. There are not many motorcycles in Kendall. For bikes, the cost is relatively cheap but it is just easier for her to go anywhere with an electric scooter because she doesn't have to paddle that much.

9. **What facilities do you want to have but are not yet facilitated and available by Kendall transportation?**

It is already well facilitated, it is just that she needs the T-subway to be more punctual.

10. **If you could add a new feature or service to the transportation area… ● What would it look like?**
    - **How would it change your experience with the system?**
    - **How would you prioritize this new feature or service compared with existing features or services?**
    - **What should we be sure not to change?**

She is not sure about this, for the scooter she thinks that she needs designated parking spots like bluebikes so she can park it more freely. Right now there is also too much construction and

the bike lake is very accustomed to it. She would want the safety part to be improved, if she rides a scooter she is afraid that someone might fit her. However, for walking, she feels that Kendall area is already a very safe place to walk.

11. **View about the importance autonomous transportation**
    a. **If you had an autonomous vehicle to take you around would you be comfortable to ride it?**
    b. **Are you excited or skeptical? What is your fear about this change?**
    c. **What part of your day to day mobility activity within public transportation that you feel you want to make it autonomous?**

She is still skeptical about autonomous transportation because it is not only about knowing how to drive well, but also about anticipating what comes to you. However, she prefers to have a safer way for her to transport her electric scooter because she is afraid of hitting another transportation when she is on her scooter.

12. **View about the importance autonomous transportation emission-free**
    a. **Do you think it is necessary for public transportation to be zero emission-free?**
    b. **How soon do you envision this becoming available?**

The transportation does not have to be zero emission-free, as long as it can reduce the emission it is already very good. She is quite aware of that and she thinks that this mode of option is becoming available from now, even though she does not specifically say what kind of transportation mode she is aware of. From the interview it seems that she is still unaware about the alternatives for emission-free transportation around the area.

13. **What are your suggestions for the current transportation system in this area? What would you picture the future transportation system in this area promoting Kendall Square as "the new entrance of MIT"?**

She pictures more punctual schedules for the T-subway and more designated places to park other personal electric vehicles like scooters.

Member 11

Stakeholder is a 2nd-year master's program student who lives at Ashdown that survived the worst of covid lockdown on-campus

Interviewer:
So OK, so so to begin. The the thing we're trying to do is that we were trying to envision like a future of transportation system around MIT. So as I said before, like before the interview, you know we want to take your opinion on like what are the current statuses .Or what you may want out of the system?

Interviewer:
Now, so what does your typical day look like regarding your commute around MIT? It maybe going to class or doing groceries. What kind of transportation do you take?

Stakeholder:
So mostly, since this year I've started living on campus, most of my transportation. My commute just involves a lot of walking and, Uh, I also use blue bikes. OK, almost all the time like commuting to school and groceries. Most of the time I walk, but let's say I would want to go to trader Joe or something. I would then bike when the destination is a little further than a walking distance. Yeah, but. So I think my concern with that is that it's going to get colder pretty soon, so biking is also not really, uh, you know a good option on most of the days on some of the days, yeah, so.

Interviewer:
Uhm, do you take the T? I mean the logical next step.

Stakeholder:
I do take the T but very few times I would do that when I wanted to go to Boston. I actually also bike to Boston more often than taking the T.

Interviewer:
OK. so what's your sort of like the deciding factor between you know, biking instead of T

Stakeholder:
2 main factors. One is my personal preference. I like to walk. I mean I like to be outside and taking the T You're not actually like you can't really see out except for when it's crossing The river. And another. Uhm, another factor in that. So the like the T line that is close to here is only the red line, but sometimes you know I would want to go to somewhere else where the red line doesn't come back to and I checked on Google map and you know it actually takes like one time I wanted to go to Chinatown. I checked on Google map it's like the same. It would take the same time amount of time as you know, biking and taking the T because you have to transfer to

another line. And the fact that MIT subsidizes bluebike makes the commute decision ever easier.

Interviewer:
Uhm, so we wanted to ask, for example, what works well with your current commute. So you you did say mostly it's biking and walking. for example, in your current commute pattern, like if you can add like a new feature, for example to either the biking system or the T. What would you envision it?
Stakeholder:
I'll start with the bikes.

Interviewer: Sure,
yeah.

Stakeholder:
So with the bikes I think I find the current system pretty efficient apart from the fact that sometimes theres not enough bike parking or bikes to go around. it's more like the availability of the bikes at Peak times, yeah.

Interviewer:
What about the T?

Stakeholder:
For the T. I actually don't use it much

Stakeholder:
That aside, for now I actually want to talk about that transloc MIT.

Interviewer:
Sure, sure sure.

Stakeholder:
Yeah, 'cause I haven't used it this year, but last year I had been using it because I have to work at a friend’s house.

Stakeholder:
sometimes I think the radius it covers isnt enough. Sometimes I would go to a friend's house Just further in Summerville, but I cannot get the bus back because it's like out of the range service. And also it sometimes takes a lot of the waiting time is really like depends on how many people are using it because it's ride sharing. I mean the the bus is right here. But if along the way, Someone else requested it, and it's closer to the car. It will go to that person, so it's like, uh, route. I ended up having to wait for like almost half an Hour or something?

Interviewer:
OK, Route planning.

Interviewer:
We can come back to the T later if you have other thoughts.

Stakeholder: Yeah,
OK.

Interviewer:
How would you rate the transportation around MIT Cambridge area on a scale one to 10?

Interviewer:
How happy you are with the general situation.
Stakeholder:
I would Say the like 7 or 8 maybe. Because so far I Have actually not run into any major issues OK, but I mean besides the ones you you sort of told us about, it's like a quality of life thing rather than like a pure I can't get there. But sometimes I feel like in the T at night it could also get a little bit scary.

Interviewer:
So if there's one thing about the current setup that you would like to keep, what would it be?

Stakeholder:
Uhm, I think it would be the ability to check the availability of like of different MIT Transportation services real time.

Interviewer:
How important it is for this new transportation to sort of have like autonomous features? So say for example self driving on a scale 1 to 10.

Stakeholder:
Could you maybe explain a little bit?

Interviewer:
OK, so. Just as an example, yeah, so for example, if we were to have, for example, a new subway system for example, or a new bus system. If

Stakeholder:
It's not really a big factor for me,

Interviewer:
so the second part is sustainability.

Interviewer:
So one of the big things at MIT is I'll talk about sustainability. 0 admission kind of thing.

Interviewer:

How would you imagine that, for example, a new transportation system if It has more sustainability factor. Would that impact your decision in either supporting this or or you know, getting?

Stakeholder:
this is like more important to me than autonomy

Interviewer:
How would utility, as an example, being used for convenient shopping, would this be like an important factor to you?

Stakeholder:
You mean like accessibility?

Interviewer:
Kind of, So in our previous interviews, I guess you know some people talk about having stations near the major housing areas or having stations at shopping centers. Having routes that covers, for example, having another direct route from here to maybe Brookline or Fenway, that kind of thing.

Stakeholder:
Yeah, I think that's important

Interviewer:
So the on on the three things.

Interviewer:
It's utility is sustainability and then autonomy.

Interviewer:
And lastly, there is another thing called strategic orientation, but I think I mean we had to ask, but you know this is, I'm not sure whether you've thought about this. So you know, MIT has like a strategic orientation where where where they want to make Kendall Square as the new hub, or as a new entrance for MIT.

Interviewer:
So in your opinion, does this matter?

Stakeholder:
yeah, I do know of the plan, but not into details, but I think maybe that the strategic orientation should be that the transportation should be thought of in a more systematic manner into incorporated into planning. But I'm not sure if that's going to really work, because I feel like the transportation system Came before the plan of converting them, yeah, but at least you know like improving the station quality or environment.

Interviewer:
Yeah, right, that's that's true, that's true. so basically sort of like upgrading kind of existing handles with squares transport capabilities.
Stakeholder: Yeah,
yeah.

Interviewer:
What kind of consideration do you feel or the consideration of transportation system do you think are important?
Interviewer:
Like besides, like the things we talked about or You talked about.

Stakeholder:
I think we've covered this a little bit already, but I think the cost of transportation is a major factor for not just me, but like a lot Of people living around here

Interviewer:
I just incorporated it into the existing discussion, would cost be the most important factor in your consideration? even more important than sustainability or utility?

Stakeholder:
Mm-hmm OK, so utility is still number one. Cost is probably more important that sustainability

Interviewer:
The last question is so is there anything that you would like you know to add?

Stakeholder:
I'd say I'm done with talk about something I don't know if any other people have talked about before, Communication I mean like in terms of how it communicates, all these benefits to their students is very obscure, since communication is key in enabling more systematic travel or I guess promotion of any new transportation.

Interviewer:
A really good point, you know.

Interviewer:
Thank you for your time!

Member 12

Transcript

[*Interviewee* has been primed on context of future transportation at MIT / Kendall]

Warm Up Elements

Interviewer – Please tell me a little bit about your background, and how long you have been at MIT.

CSAIL Post Doc [CPD] - I am [redacted] a Post Doc at CSAIL the computer science artificial intelligence, which is located in this data center building 32, and I have been living in the MIT area for the past 8 years.

Main Questions

Interviewer – What does your typical day look like?

CPD – So, I'd say that now given the pandemic I have sort of two typical days, like the one where I stay home and work from home. I don't commute, I just drop my daughter off at her school which is a 15-minute walk – unless it's raining or snowing – and return home. The other typical is that after dropping her off, I drive to and work at MIT while my daughter is at school.

So I drop off for her school is around 8:00 to 8:15, then it depends, because now the traffic is very bad. My work day start at about 8:30. Now that everybody has come back from COVID, it sometimes it takes me a little bit longer to get to MIT, and I park my car in the Data Center garage. Then I stay until more or less 3:30pm 4pm because again traffic is pretty bad.

Interviewer – What transportation do you currently use for MIT and your other needs within and around MIT and Kendall square? Describe the different ways that you currently use the system. Does the current system meet all of your current needs?

CPD – So now I'm driving, because I have kind of no choice in the sense that I cannot use my bike anymore because I'm pregnant and I'm at high risk of condition and cannot take the "T." I live to far away and can't walk. Therefore, my only option is to take the car. Further, I am also aware that because of COVID, I cannot share my car because the risk is too high. For example, most of my coworkers are either senior, grad students or postdoc, a very few of them have family, or kids that are unvaccinated, so they tend to ride with more people and socialize, so thinking about being in the car with them, I'm not comfortable with that.

Interviewer – Do you usually travel alone or as a group or family?

CPD – We try as much as possible to go as a family. So, the three of us will leave home and drop our daughter off at school. Then I drive my husband to his office, go to MIT, and then pick him up when he's ready. Maybe twice a month he will drive himself.

Interviewer – So have you ever used public transportation like a bus or shuttle in the area?

CPD – Yeah, I used to be a heavy user of public transportation. Even before I got pregnant, I would bike my daughter to school and then bike to MIT. I did this often last summer when we lived in East Cambridge. East Cambridge is not very good with the MIT shuttle but MIT has these other shuttles. I think it's called EZ Ride?

Interviewer – Perfect. So on a scale of one to 10, how happy are you with public transportation?

CPD – If you live nearby the routes, it's pretty good – but that's limited. Most of the time, it's more difficult. We kind of got lucky that we rented a place that was nearby [public transportation]. Further, I found it very hard to actually figure out [public transportation]. So basically, you get a place, then you figure out how you deal with it. So in that sense, it's not very good because you don't get the flexibility of where you live.

Interviewer – So, in your opinion what worked well with the transportation system in the MIT area?

CPD – Bike parking is limited. MIT should make more bike parking. It was hard to actually find a place to park my bike around Strata center if you would get to campus after 930 – 10am. I had a baby seat on my bike, so I wanted my bike to be protected in case it rains, and there are very few bike parking spots that are covered. There are a few covered spots in the tunnels, but it takes a significant amount of time – 5-10 minutes – in order to make it down and back up.

Interviewer – Have you ever used the blue bike system? Why?

CPD – No, I've never used the blue bike system. The blue bike system started the year that we got to Boston and they were kind of limited in availability and not very close to where we lived. We used to live closer to Harvard Square but not the main part of our road. So if I wanted to use a blue bike, I had to walk like 10 minutes, not toward MIT, and it didn't make sense.

I lived in Paris for a few years and I used the biking system there. It was much cheaper than blue bikes and they had stations everywhere. So, for me, this reference is why blue bikes were unattractive.

Interviewer – What kind of transportation would you prefer for you and your family?

CPD – I think if we would stay in the Boston area it would be a mix, mainly because of the weather. We love biking around, but the moment you get snow, we're done biking – especially if you bike with kids on the back. It is way too dangerous! So we can't think about biking all the time. We need Plan B, and plan B with kids would be needing a car. We have a car. Also,

because we like going for a number of trips during the weekend. And if you want to get out of the Boston area, you need a car.

Interviewer – Do you prefer a personal transportation system like your own car or your bike?

CPD – Not necessarily. When we lived in Harvard square, we used the T and bus a lot. They are not as reliable as I was used to in previous cities for many different reasons. The T sometimes would take more than 30 minutes between each car to come because something had happened in one part of the T. I also had a bad harassment experience with a guy that tried to lock me up. So I use the T if I have to, but I feel that the T in Boston is not a good mode of transportation.

We live really close to Alewife, and we choose to live close to our works to have [public transportation] as an option. If I wasn't pregnant, I'd rather take the T. But right now – I have to take the car and pay $11 per day.

Interviewer – Do you prefer door-to-door or stop-to-stop transportation service?

CPD – To be honest, I think the critical thing for me is reliability. Sometimes Uber isn't very reliable. So either the bus system, or an underground system that is really reliable, I would rather do that than the rideshare.

Sometimes if they are not reliable then I do the rideshare but I don't consider rideshare to be super reliable and it really depends on the time of the day and weather. For example, if it starts raining, Uber is either extremely expensive and very difficult to get. I'd rather support another transportation system.

Interviewer – What do you think about autonomous transportation systems?

CPD – Yes, I mean, in Paris, I loved the autonomous lines and I would prioritize those lines over other lines. So I think autonomous vehicles on the subway work very well. If you ask me about autonomous Uber or autonomous cab, I'm less comfortable. I don't know if an autonomous vehicle can recognize you when you are behind it.

Interviewer – Do you think the technology is sufficient to have autonomous vehicles?

CPD – I think it's a mix of things, because yes. I can imagine an autonomous car driving around Boston, but I have doubts about an autonomous Uber within a city that has narrow streets and where people driving aggressively. So, it's not just putting technologies on the streets, because you have to put that technology within the context of the city, and I think that's the challenge.

Interviewer – Do you think it's necessary to have a zero-emission transportation system?

CPD – Yes. I think it's a great idea if the transportation chosen for Boston is one of them. For example, there is a bus that goes from Harvard Square to a hospital in Auburn and then continues to Watertown, and you can see the electric lines at the top. There is also a bus that you take from the airport, and half way through it changes from electric to traditional bus because there are no more lines, and although I'm not a big fan of the lines, I think we could have a fleet of electric buses for Boston and that would be great.

Interviewer – As a mother and a student, does your current transportation system meet your needs?

CPD – Yes, except on bus line 1. If you take bus line 1 during rush hour, the buses are very crowded and there's no room for a stroller. People get upset because you're using a little bit more space, but I would say yes.

Interviewer – If you could add one new feature to the public transportation system, what would it be?

CPD – For me the most critical thing is reliability. I feel like here, the rideshare apps don't deliver reliable information. And neither do the bus/subway – they have a time lag – so sometimes there will be errors and they would be showing either trains, or buses that were out of service. The other option would be to have a better schedule and show that the buses go every 10 minutes or something like that, provide the right information so that I can schedule myself and use my time better, that's why for me reliability is the most important thing.

Interviewer – What type of transportation system has benefited you the most?

CPD – ZIPCAR! Usually finding a car for our needs is difficult and sometimes ZIPCARD would do these weekend deals where you could rent the car for the whole weekend at a better price, something like $100 for the whole weekend. We would take it for a whole weekend and then do our shopping for the week. I used it [Zipcar] a lot as a replacement for the bus because it's for half an hour. We also used the MIT discount code.

Another great feature is that since we traveled around the United States a lot, you could rent a car and go DC for example and then return the car there. We didn't even have to think about traveling and then having to return the car here in Boston.

Member 13

A graduate student at the Department of Material Science and Engineering at MIT

Summary of Questions and Responses

- **What does your typical day look like?**
    - Morning - goes to class, Lunchtime - goes to Student Center, Afternoon - goes to the office, Evening - Returns to the dorm after dinner.
- **How often do you use transportation around campus during a typical day?** ○ Mostly walks to different parts of campus. Also frequently uses Blue Bikes ○ Will take subway to places that are 2 to 3 miles away or more.
- **What is the mode of transportation you predominantly use during a typical day?** ○ Walking.
- **On a scale of 1 to 10, how would you rate walking in the area? Why did you give that score?**
    - 8 out of 10. Places of interest are close to each other and weather is good.
- **What problems do you have with walking?**
    - Limited to 0.5 to 1 mile radius, otherwise would be too long.
- **Do you have experience with other transportation systems (e.g. in other cities)?**
        - Yes, bus and subway in other cities (mentioned Beijing)
    - **How does that system compare to the campus transportation system?**
        - Service in the MIT area is efficient and convenient
- **If you could add a new feature or service to the MIT/Kendall Square system … ○ What would it look like?**
        - Not much to be improved. Maybe more bus lines or more frequent bus service.
    - **What would you NOT change about the current system?**
        - Bus system should stay. Interconnected buildings should stay.

Transcript

Interviewer: So from now we can start an interview.
Interviewee: OK.

Interviewer: Today we will have the MIT student SDM interview. Hello, my name is Cao, Jiannan SDM cohort of 2021. Part of assignment for course EM.411. Thanks for agreeing to have an interview. We would like to understand how the future of transportations looks like in the MIT campus, and the Kendall Square area. I'm currently a graduate student at MIT. This is part of an assignment for our course EM.411. This interview will take approximately half an hour. What you tell me will be considered confidential. The results will be reviewed only by instructors for great grading purposes and will not be published, or said anywhere, individual names and other personally identifiable information will not be disclosed. I believe that your input will be valuable to this assignment, and in helping in growing or professional practice. With your

permission, We will record audio and take notes during the interview. The recording is to accurately record the information you provide, and will be used for transcript purposes only. If you choose not to be audio recorded. I will take notes instead. If you agree to being audio recorded...
Interviewee: That's great. OK, so.
Interviewer: OK, next thing is that, do you have any questions or concerns before we begin?
Interviewee: No. Please go ahead.
Interviewer: OK. So I'll promise you that there's no right or wrong answers. So feel free to interact as questions clarify for me. If a question makes you comfortable I can stop the interview at any time for you. This is confidentiality and anonymity. And we'll record this interview with zoom. ***Interviewee***: OK.

Interviewer: Um, please tell me a little bit about your background, and how you get into this role.
Interviewee: OK. Currently I am a graduate student at the Department of Material Science and Engineering at MIT, and I'm considering my background as I'm previously an undergraduate student studying Physics in Peking University. In that program, I studied Contrast Matter Physics and had much of the relevant courses and research. After that I applied to the PhD program at MIT. In MSE and after that, I am here to perform my research to complete this program here. OK, This is general information about my background.

Interviewer: What does your typical day look like at MIT?
Interviewee: Typically, I first go to the classroom in the morning, and I take the class. And after that I will go to the student center dining hall to have lunch. After that I come to my office. And finally, I usually return to my dorm after dinner.
Interviewer: How often do you use transportation around campus during a typical day?
Interviewee: Oh, emm, by far, the better way to use the transportation is to use some specific tools like vehicles or if I walk. Does it count?
Interviewer: OK so, like, if you're walking you can say, you only walk. If you use some shuttles, like MIT Tech Shuttle, or EZRide, or you take the bus or take the subway, and you use other transportation ways...walking is also a way of transportation.
Interviewee: OK. Most frequently, I walk from place to place and this happens approximately 4 or 5 times every day. And another, I think, the second highest frequent way of transportation is by bike. I use Blue Bikes in Boston and use that way to a little further places like supermarkets, or to meet some students in other universities or campuses. Another way to transport is by subway. I only go by subway when we need to go to places that are quite far away, like more than 2 or 3 miles away. In this condition, I will go by subway. I think this is generally all methods I used for transportation here.
Interviewer: OK, so next question, please describe the different ways that you currently use the transportation system. In each case, how does the system function meet your needs?
Interviewee: Let me see...
Interviewer: So you have, maybe you have answered in the previous answer?

Interviewee: Yes, I think probably. I think I may include a little more information. I think I use the transportation of the bicycle frequencies about twice a week, and I use the subway I think about twice a month.
Interviewer: OK. What is the mode of transportation you predominantly use during a typical day?
Interviewee: I think the mode of transportation means the kind of transportation I use?
Interviewer: OK. In your case, I think that is walking. ***Interviewee***: Yes, it is walking.

Interviewer: OK. On a scale of 1 to 10, how would you rate the walking in the area? Why did you give that score?
Interviewee: I think I'll rate it 8, because, actually, the places are close to each other and it's convenient to walk in Campus, and also the weather is good and the temperature is usually moderate. I think it is a good experience.

Interviewer: OK. What problems do you have with walking?
Interviewee: I think the problem is that it only approaches a limited range of area, for example if the distance is larger than 0.5 mile or 1 mile, it will be a real hate that it is too long to walk to the area.
Interviewer: What currently works well for you with walking? So,
What's good side of walking?
Interviewee: I think that is convenient and it doesn't require preparation so like waiting for some other vehicles to come.

Interviewer: Do you have experience with other transportation systems? For example, in other cities?
Interviewee: In other cities, I also have experiences like by bus and subway, and I mentioned bicycles so I don't mean to talk about this here again.
Interviewer: So, how do we compare them with MIT transportations? How does the system compare to the campus transportation system? Is there some difference between transportations in Beijing?
Interviewee: The transportation in Beijing...actually I think the subway lines there...it can approach more places I mean. At that place, I may come to very far away places with the subway and it seems more convenient and comfortable than here. However, I think in campus size I seldom have such a long distance travelling need. So, this is not a serious difference.
Interviewer: OK. Um, so, anything you like or dislike about the system? So you've already talked about that?
Interviewee: You mean the transportation system in Beijing?
Interviewer: I mean, of course you can see that there's a good side of the transportation system in Beijing and also the campus, but I think we should focus on the campus system.
Interviewee: I think the system in the MIT campus is, I generally like this system. I think it is efficient and convenient.

Interviewer: OK. So, If you could add a new feature or service to the MIT/Kendall Square system what would they look like?
Interviewee: Let me see that…
Interviewer: The transitions status quo is not good, right? if there are some disadvantages from this system. So, what do you want to add to this system? Like you're the product manager or manager of this system. So, what features do you want to add to this system? Would you add some features to this transportation system?
Interviewee: I think generally the transportation system inside the campus is quite complete, there are school buses, although I don't usually use them, but actually I usually see school buses come from place to place. Therefore, I think. Generally there are not many things that need to be improved.
Interviewer: OK, so how would it change your experience with the system? So, do you want some bus lines or do we just need to change the line?
Interviewee: I think if more bus lines, or more frequent buses are included from the dorms to the classrooms and to the office, to the main area of the campus near research activities I think this will be helpful.

Interviewer: OK. how would you prioritize this new feature or service compared to existing ones? That means if you add this feature, will you use it more often than the old ones?
Interviewee: I think...let me see if they are very, I mean, if the school bus, for example, the starting point is, and the ending point is very close to the place I want to go, I think I'll more frequently use school buses than walking.

Interviewer: OK. What would you not change about the current system? ***Interviewee***: I think most of that...I mean, the system is actually quite complete and I think most of the parts already work very well. So, I think many parts like the already existing school bus lines are good. Another thing is about the very high connectivity inside the buildings. I think it is also convenient to come from one building to another. I think this is also a good thing about the current system. ***Interviewer***: OK. So, is there anything else you think is important that we can talk about.
Interviewee: I don't think of anything else related to this topic.

Interviewer: OK, so do you have any questions for me?
Interviewee: about what's the purpose of this interview and how will the interview record be used in the future?
Interviewer: So, this, this is just a practice of how we can make an interview for a new plan or a new engineer project. So, for this purpose we consider the convenience of this MIT transportation system. So we compared it with other city systems, and also other school transportation systems so that we can find the new points to improve the MIT transportation system. So this is just a toy interview for the class, but it may help the MIT campus transportation system improve for student life here. That is how this interview proposes.

Interviewee: Thanks.

Interviewer: That's all. Thanks for your time!

Member 14

Interviewer: Good afternoon, thank you for joining me!
Interviewee: Happy to help
Interviewer: Like we talked about briefly before we have an interview to understand different perspectives on our project, the plan is to start with some background information and lead into more specific questions.
Interviewee: Let's do it.
Interviewer: Please tell me a little bit about your background, and how you got to this role?
Interviewee: I have been on campus for 2.5 years, since June of 2019. I'm in the Navy was a SWO and am currently in grad school to get a degree to be an engineer for the navy in mechanical engineering and naval architecture. Originally I lived a 20 min walk from campus in Cambridge, I would typically walk or take bus route 1 to campus depending on the weather and the time of year. The bus would take me 10-15 minutes as well so there was not a big time difference. Currently I am now living in Providence, it is 1-2 hours door to door, from my apartment to where I work on campus.
Interviewer: What does your typical day look like now?
Interviewee: I come to campus 2-3 times a week, I am only working on design project and my thesis, that looks like getting up between 0300 and 0500 then either I drive and park in commuter parking off of Vassar St before taking a 15 min walk to building 5. Alternatively, I take the train. It's a commuter train from Providence (10 min walk from my apartment), it's about an hour and 20 minutes to south station where I take heo red line to Kendall/MIT, from that stop it is a 10 min walk to the office. I actually bought a razor scooter a few weeks ago to try to cut down some of the walking time.
Interviewer: Where do you store your scooter?
Interviewee: I store the scooter at my desk at my office, typically under the desk. It's a little annoying on the train but worth it to me. Oh another option I take is the commuter rail to Back Bay then blue bikes into the office.
Interviewer: What works well with your current transportation system?
Interviewee: The fact that where I live has a commuter rail that comes to the city is lucky, I did choose Providence for that reason, it's only a 10 min walk that connects me to another city. Train and commuter rail is comfortable and I can be working during my commute. Having a staging area on campus (desk and office) allows me to leave a lot there, so it's an easier set up. if I didn't have this set up I wouldn't be coming to campus as frequently as I do.
Interviewer: What problems do you have with the current transportation system?
Interviewee: There is no way for commuters to get to the center of campus easily. T is on the Sloan end and the parking lots are on the complete opposite side. It doesn't seem like a lot but 15 mins each way adds up especially when commuting and adding the extra time is tough. Even when living on campus, I didn't love the buses, but the 1 bus stop did drop off at 77 Mass Ave.

Interviewer: Does your manner at which you arrive on campus limit the way you interact with campus while you are on?
Interviewee: Yes, I am more likely to workout on campus if I drive because I go by the gym on my way back to my car. If I don't drive I will just workout at home.
Interviewer: So do you spend more time on campus when you drive?

Interviewee: No, no matter what manner I go I am tied to a time schedule. Commuter rail departs every hour, meanwhile the drive dictates what time I leave. When I drive I actually spend less time on campus to leave by 1:55. If I don't leave by then it can take me over two hours in traffic to get home. When I take the train I spend more time on campus because I can leave at 4 which would be an impossible time to drive home.
Interviewer: In each of the cases, how well does the system function meet your needs?
Interviewee: What do you mean?
Interviewer: Is there a need for your transportation that is not being met?
Interviewee: Not that its a need, but it would be significantly easier for me if there was transportation across campus, the bus and train system go up Cambridge, but there is nothing that goes across campus.
Interviewer: If you could add a new feature or service, what would it look like?
Interviewee: Something that is well timed to the various modes of transportation that is public, available when the red line comes in, that is semi-regular, goes from Kendall to the Student Center with a couple stops along the way. Ideally it would be along Vassar or along Memorial. That would speed up getting across campus.
Interviewer: How would that change your experience with the system?
Interviewee: I think it would cut down significant portions of time that are controllable, the controllable aspects. Like I did try to control it with a scooter. It would give me more use out of my days that I do come to campus, so I could be on campus longer doing work. It would give me more flexibility. There are times when I have a meeting or something and I'm in the area for an extra hour because I miss the commuter rail by one minute. Having less transition time gives me more flexibility for my commuting options.
Interviewer: How would you prioritize this new feature or service compared with existing features or services? Where would it fall on your transportation needs?
Interviewee: It would rank low because my larger transportation need is from Providence to Boston. If I were to break them down I would say break down is to Boston, to campus, to across campus. It would be number 3 among those. The others I can't do without infrastructure, this one I can.
Interviewer: What should we be sure not to change?
Interviewee: Couple of things, even with covid accesses not being every door, there are still multiple ways to get into buildings so that should not change. The walkability, the sidewalks being everywhere. Don't take away someone's ability to walk where they need to go. The current blue bike presence could be better, but don't make it worse.
Interviewer: Could you expand on what you mean by the blue bikes?
Interviewee: Blue bike stations by the commuter lot would be money, then some at 77 Mass Ave. There is one, maybe a 5-8 minute walk from Kendall. Blue bike stations at the point of entry to campus would be really helpful. They are where you want to go, but not any to help you get there. No way to get you in from the outside. Something that would very simply help the problem. It's not a solve all, the blue bikes are already there, they ferry bikes places, and they already track the data. Even a bike rack at the commuter lot, would be something. Even more bike racks around campus.
Interviewer: Have you had a noteworthy bad interaction with public transportation? A singular event?

Interviewee: No, I have missed the commuter rail by one minute on multiple occasions, which is an hour difference in commute. I don't think so. One of these days I think I will get covid on the train though, but that hasn't happened yet.
Interviewer: On a scale of one to 10, how happy are you with public transportation in the area?
Interviewee: 5
Interviewer: Why did you give that score?
Interviewee: It is good, it is robust, it is reliable, like once you know the system it is easy to work within. I am comparing Boston to what it should be not compared to elsewhere. Compared to elsewhere it is massively good. There is a massive issue with the public transportation in Cambridge that it goes in one direction. It bothered me when I lived in Cambridge and where I live now. It only helps you get to Cambridge not across.
Interviewer: What level of service are you looking for?
Interviewee: What do you mean?
Interviewer: What would get it from a 5 to a score that you expect?
Interviewee: Some form of transportation as frequent as the T which is a 5-10 minute regular interval that goes across campus, or goes across Cambridge in that direction. A shuttle or a bus, or something that has the same cadence as the T, you're not waiting that long for the red line or green line and I need a way across campus.
Interviewer: What advantages have you had with this public transportation? The current one.
Interviewee: It's free for the military, discounted for MIT students if I can't find an attendant to let me on with my ID, that is nice. Reliable. Big advantage. Robust, it gets me far away, I can live this far away is huge, outreach is good.
Interviewer: Do you expect to see changes in the near future in regard to public transportation?
Interviewee: No ,the T has been the same way forever.
Interviewer: Is there anything else you think is important that we have not talked about? In regards to transportation around campus.
Interviewee: Just my emphasis on bike accessibility would be nice. Even if they weren't blue bike racks, more bike racks for personal bikes within campus and at the entry points to campus would make it easier to get across. Other than that, no I don't think so.
Interviewer: Thank you for your time, have a great weekend!
Interviewee: You too!

Systems Engineering

Opportunity Set 3 – Stakeholder Needs and System Value

Out Date: Wednesday, October 11th, 2023
Due Date: Wednesday October 25th, 2023 10am

This assignment is completed in 2 parts:

1) **Part A will be completed by your Fall 2023 H2 team**
2) **Part B is an individual assignment**

Intents

- Gain experience defining stakeholder needs, including:
  - *Distilling user needs from a variety of information sources, including documents and interviews*
  - *Synthesizing workable user needs from interview data*
- Learn to develop and prioritize stakeholder needs
- Define quantitative measures of system value delivery
- Develop use cases to illustrate how stakeholder needs are met

SDM Learning Objectives Addressed:

- SA05: Identify and prioritize the stakeholders of the system quantitatively and qualitatively, and elicit and prioritize their needs.
- SE02: Elicit, define and, formally articulate system value to help guide system priorities and structure value-generating activities across the system lifecycle
- SE03: Analyze, understand, and represent system behavior by defining and analyzing system missions, operations, modes, and use cases

Context

You and your H2 team work at Systems Design Masters (SDM) – a prestigious analysis group that solves large-scale systems problems. Your team is developing a vision for the future of surface mobility in the MIT campus and greater Kendall Square innovation district[1]. This is part of your firm's business development efforts – you don't currently have a defined sponsor, but the target client(s) are MIT and possibly affiliated organizations with an interest in mobility in the MIT campus and greater Kendall Square innovation district.

You have done some preliminary investigation and determined that you will need to consider:

[1] Loosely defined, but potentially stretching in an arc from Central Square to Cambridge Crossing and including MIT and Kendall Square proper.

- **Utility** – Your future vision will produce benefits beyond current transportation offerings (e.g., the system will address most day-to-day needs of a diverse set of stakeholders)
- **Safety** – You will address on-going concerns about various aspects of safety (personal, health, public) to inspire confidence in this new approach to surface mobility
- **Sustainability** – Your future vision should be emissions-free at point of use as soon as feasible and significantly reduce the overall emissions associated with surface mobility in the area
- **Autonomy** – You should explore the use of autonomous technologies for potential beneficial impact on utility and to make a bold statement about the future-embracing orientation of the area
- **Strategic Orientation –** Your proposal should align with the region's growth strategy including promoting Kendall Square as "the new entrance of MIT" and enhancing the area as an innovation ecosystem

Before you start exploring solutions, however, you will need to identify and prioritize stakeholder needs, develop metrics, and define likely use cases.

A separate group interviewed various stakeholders relevant to the Kendall Square mobility system. They created transcripts from each interview, and these transcripts have been made available to you for your analysis. As a source of information about stakeholder needs, they are limited to the sample of stakeholders who participated in that study, which was conducted within the last 3-4 years. The stakeholders represented in the interviews may or may not represent the complete group of potential stakeholders in this system. Because the references in the interviews are a bit dated, you should seek any publicly available studies, reports, documents, or even additional interviews where possible that can provide additional context and supporting information for your analysis.

Part A – Completed by your H2 team (50% of total OS grade)

1. Define the mission and goals for a future surface mobility system in the Kendall Square innovation district. This includes the problem(s)/opportunity(ies) to be addressed, the potential resulting value from addressing them, and why action to resolve the problem is necessary. Describe the context for the mobility system in the area of interest. This might include a description of how you define the Kendall Square innovation district and its evolution (past, present, and perhaps projections into the future), the population, economic drivers and trends, what happens during a typical period of interest, and the existing mobility solutions. (up to 2 pages of text and figures). (15%)

2. Identify the relevant stakeholders/beneficiaries for the transportation system, and their needs. What does the stakeholder need from the system? What does the system need from the stakeholder? How well is the need currently being met? Present your findings in table format, as in the example of a restaurant below, framing "needs" within a context of outputs and value exchange. The reader should be able to quickly understand the magnitude and relative ranking between the needs. (1 page) (15%)

Stakeholder /Beneficiary Category	**Their potential output that would meet our needs**	**Our potential output that would meet their needs**	**Degree to which the need is currently met**	**Source(s)**
Example: Walk-in customer	*Payment for food, tips and positive word-of-mouth*	*Healthy, nutritious meal and quick service in a clean, hygienic environment.*	*Low. Only 1-2 options currently available, and they are often crowded during peak times*	*Street interviews, survey of restaurants in area*

3. Prioritize the stakeholder/beneficiary needs using analysis of your choice. Explain how you decided how the needs should be prioritized (i.e., what criteria, system, method, etc. did you use? How did you ensure that your approach was consistent and rigorous? Do these top needs trace back to the system goals?). (1 page) (10%)

4. For the top five stakeholder/beneficiary needs for the Kendall Square surface mobility system, identify metrics to quantify success and provide a description and the units of the measure. What information would you need to collect to set targets/objective levels for each of these metrics? (0.5 page). (10%)

Part 2 – Individual assignment (50% of total OS grade)

5. Based on what you learned about the system mission, context, and user needs, define 3 system scenarios. The scenarios description could include the activity with steps in sequence, capabilities/systems employed, timeline, diagrams or maps, or other materials that provide information to help derive system functions and requirements in later analyses. Be sure the scenarios you describe are differentiated from one another in substantive ways (e.g., based on different users' needs, measures of performance or effectiveness, operations, capabilities etc.) (no more than 2 pages of text and figures) (25%)

6. Reflect on your team and individual analysis of a future Kendall Square innovation district transportation system. What is your level of confidence (or

conversely, uncertainty) in your understanding of the user needs? Would you feel confident to make commitments about system requirements and concepts based on the stakeholder needs as you've currently defined them? Assume that you just received approval for a follow-on study with additional time to focus on developing this system concept. Develop a list of objectives and tasks that you would recommend executing to help you to more accurately define the system, stakeholders, needs, operations, etc. to increase confidence in your recommendations. Assume that the resources available for this follow-on study are not large, so prioritize the next steps and focus primarily on the additional work that will be of greatest benefit to the decision-makers who receive your recommendations (up to 1 page) (25%)

Evaluation Criteria (a summary of grading rubric)

Your team response to OS3 will be graded using the following criteria:

Q1: We are looking for a description of the potential operating environment for the surface transportation system using sourced evidence. We expect a clear definition of the system and its boundaries, including the system mission statement. We are looking for a measure of the scope and/or value of the problem to the stakeholders.

Q2: We are looking for clearly defined stakeholder categories that represent a spectrum of stakeholders. We expect clear articulation of inputs, outputs, and the degree to which the need is met.

Q3: We are looking for the correct use of some formal method to quantify/prioritize the stakeholder/beneficiary need, with a logical explanation of the rationale for selecting that method. We are looking for the needs to be clearly prioritized indicating priority order.

Q4: We are looking for 5 system-level metrics with a clear description of each metric and the way in which it could be measured, including the information needed to set targets/objective levels for each measure.

Your individual response to OS3 will be graded using the following criteria:

Q5: We are looking for three differentiated scenarios that reflect a spectrum of key stakeholders, different modes, and potentially requiring different capabilities. We expect clear evidence for why the scenarios are different from one another.

Q6: We are looking for evidence that you understand the strengths and limitations inherent in the data sources included in this analysis, as well as a path toward collecting additional information to reflect a representative sample of system stakeholders/users or other relevant information (if you deem it necessary). We are looking for your reflections on the kinds of information and analysis products you think will be most beneficial to decision makers contemplating change in a complex sociotechnical system (comprising both social and technical elements) such as this.

Appendix 1: Stakeholders Interviewed Previously

Organization
Supplier - Aptiv
Cambridge Traffic, Parking, and Transportation
Eastgate Residents Executive Committee
Head of Government and Communication office, MIT
Kendall Square - MIT New Front Door
Kendall Square Community
MBTA
Media Lab - City Science
MIT Facilities Information Service
MIT Housing Office
MIT Police
MIT Student Disability Services
MIT Parking and Transportation
Sloan Sustainability Initiative
Supplier - Blue Bikes
Supplier - Optimus Ride