From the original RFP drafted in late 2015, the following information should be determined for each candidate civic challenge to be addressed in this event:

Required Proposal Sections

- **Background**: provide an explanation for why this civic challenge exists in the City of Cambridge
- **Definition of Challenge**: clearly define the current state of this civic challenge, and describe any past attempts—successful or unsuccessful—to address it
- **Ideal Team**: describe key characteristics or skill sets of participants that may be best suited to develop solutions to proposed civic challenge
- **Solution Deliverable Format**: describe the deliverables that should be developed by participating teams in the course of the event, and indicate any opportunities for long-term development of solutions

These draft challenges were drawn from a combination of the various Cambridge city reports provided by Taha Jennings to the GSC and the Participatory Budgeting initiative (http://pb.cambridgema.gov/) conducted by the City of Cambridge.

Each of the challenges described in this document will involve aspects of engineering, design, publicity/outreach, and general feasibility. This will mean that any given challenge would benefit greatly from involvement by team members from all MIT Schools in addition to members of the public (e.g. high school students) who may not yet have specialized training in these fields.

**Tree-Friendly Sidewalks**

- **Background**: As part of the pilot Participatory Budgeting cycle for Fiscal Year 2016 (FY16), the city has pledged to plant “100 healthy trees for a healthy Cambridge.” However, putting trees into public spaces is often much more difficult than simply digging and planting. Beyond permission from abutting property owners, trees must be placed in such a way that they will not cause damage due to their foliage or root systems.
- **Definition of Challenge**: This challenge will involve rethinking how new trees are placed into sidewalks in such a way that (a) minimizes damage caused by root or foliage...
growth, (b) allows the sidewalk to remain usable by pedestrians, and (c) gives the tree the best possible chance to flourish. Teams will be tasked to consider short-term and long-term aspects such as water needs of the tree, the effects of wintertime sand/salt on the tree, and the ability of the tree to grow without cracking roads or sidewalks.

- **Ideal Team**: An ideal team will have knowledge in engineering or design (of materials or mechanical enclosures for the root system), public policy or communication (to devise a strategy for building support from abutting property owners and community members), and a desire to make Cambridge a greener city.

- **Solution Deliverable Format**: Teams will deliver a sketch or physical model of the proposed system for housing new trees, a rough budget for each tree installation, and a detailed communication plan meant to help build support from three audiences (general Cambridge public, abutting property owners, and the Cambridge City Government).

### Outdoor Public Exercise Equipment

- **Background**: One of the suggested projects for the Participatory Budgeting cycle for Fiscal Year 2017 (FY17) was to install outdoor exercise equipment in public areas. Many of the current sets of outdoor exercise equipment consist of pull-up bars and other ways for people to use body weight in strength training. These exercise areas will have the largest impact if they are usable by people of all ages, from children to elderly Cambridge residents.

- **Definition of Challenge**: This challenge will involve redesigning the layout of areas containing equipment, what the equipment should look like, and creation of a publicity campaign to get Cambridge city residents to use the new equipment. Teams should consider both large areas containing many pieces (as in a public park) and small standalone pieces (that could be placed on street corners and in small areas).

- **Ideal Team**: An ideal team will have knowledge in engineering or design (of exercise equipment and the “park” or other area housing the equipment), physiology or biology (to determine the best exercise modes with minimal chance for injury to users), public policy or communication (to devise a strategy for attracting community members to use the new exercise areas), and a desire to make Cambridge a healthier city.

- **Solution Deliverable Format**: Teams will deliver a sketch of the proposed exercise park area or standalone installations, a rough budget and analysis of potential locations, and a detailed communication plan meant to help build support from two audiences (general Cambridge public and the Cambridge City Government).

### “Blue Sky” Street Redesign

- **Background**: Many of the suggested projects for the Participatory Budgeting cycle for Fiscal Year 2017 (FY17) involve making major modifications to the streets of Cambridge in order to make cycling easier and safer. In France, there are plans to install solar panels into 600 miles of roadways. There are many ways in which streets...
Parking in Cambridge

- **Background:** As a busy city near Boston, Cambridge sees many motor vehicles cross its streets each and every day. Visitors and Cambridge residents alike need to find places to park their cars once they have arrived at their destination. Signs are often difficult to read, especially when parking spots just feet away have different restrictions. Payment for parking can be difficult if people do not carry coins, card readers are broken/jammed, or meters accept specialized cards issued by individual municipalities.

- **Definition of Challenge:** This challenge will involve redesigning the entire parking experience in Cambridge. Without drastically changing the location of current parking spots, design a system that unambiguously informs community members of the restrictions related to their parking spot, easily allows for payment in multiple formats, and reduces the burden associated with enforcement of parking laws and collection of money from meters (heavy coin-carrying implements currently used can pose an occupational hazard for city employees). In addition, the challenge will involve designing a system that will anticipate future parking use (such as with electric vehicles, or further in the future, autonomous/self-driving vehicles) while preserving usefulness for parking systems used today.

- **Ideal Team:** An ideal team will have knowledge in engineering, design, transportation, and public policy. An ideal team should also include out-of-the-box thinkers in addition to participants who will be able to draw out aspects of the “blue sky” plan that could be feasibly adapted to the current situation of Cambridge streets. The team should have a desire to make Cambridge a much more modern city.

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- **Definition of Challenge:** This challenge will invite teams to completely redesign Cambridge streets without regard to potential obstacles such as cost. If Cambridge could build the best streets possible, what would they look like? Completely redesign the stretch of Massachusetts Avenue between Central Square and the Charles River in order to meet the needs of the largest number of Cambridge city residents. All current uses (bikes, cars, buses, sidewalks, etc.) should be preserved, but creativity in how they are arranged is highly encouraged.

- **Ideal Team:** An ideal team will have knowledge in engineering, design, transportation, and public policy. An ideal team should also include out-of-the-box thinkers in addition to participants who will be able to draw out aspects of the “blue sky” plan that could be feasibly adapted to the current situation of Cambridge streets. The team should have a desire to make Cambridge a much more modern city.

- **Solution Deliverable Format:** Teams will deliver a sketch of model of the brand new street, including considerations related to public transportation and cycling, traffic priority (street lights and signs), parking, street materials, and all other notable aspects. The team shall also acknowledge which aspects of the redesigned street would be suitable for adaptation to the current stretch of Mass Ave being considered and develop a plan to implement these potential ideas.
Narrow-Width Bus Shelter Design

• **Background:** One of the many crowd-sourced inputs to the Participatory Budgeting cycle for Fiscal Year 2017 (FY17) was to completely redesign the bus shelters currently found at many busy bus stops in Cambridge. These shelters currently feature advertisements, limited seating, a roof, and walls on up to three sides. Some shelters contain maps and schedules, while others have fewer amenities.

• **Definition of Challenge:** This challenge will involve designing—from top to bottom—a new bus shelter with a smaller footprint. Current bus shelters cannot fit on many narrow streets in Cambridge; however, narrow-width bus shelters (with the strict constraint of having the same amount of advertising space available in the same dimensions and amount as current shelters!) could be installed at some bus stops currently without a shelter. These new bus shelters could include interactive tools to help travelers find appropriate buses, information on MBTA services and tickets, and anything else that Cambridge residents would find helpful on a daily basis; great concepts in this vein could potentially be included in all other bus shelters across Cambridge.

• **Ideal Team:** An ideal team will have knowledge in engineering or design (the shelter structure and any new amenities), communication (to devise the best methods of displaying information within the new shelters), and a desire to make Cambridge a more accessible city.

• **Solution Deliverable Format:** Teams will deliver a sketch of the proposed bus shelter, a rough budget and analysis of potential locations, a mockup of any technology (related to displays, apps, or the like) that will be used, and a detailed communication plan meant to help build support from four audiences (general Cambridge public, the Cambridge City Government, the Massachusetts Bay Transit Authority, and the advertising company who supports the bus shelters).