Thank you. I would like to begin by saying that designing lighting codes for a city is a serious manner, and deserves study, attention, and discussion. We are all trying to come up with a solution that promotes safety, energy savings, and enhances our city environment, as well as protects us from unwanted light trespass and glare, and we all would like an ordinance that is easy to understand, easy to apply, and easy to enforce, and that is fair to long-time residents, city agencies, and developers. I want to welcome Lisa Hemmerle, the city's relatively new Director of Economic Development to this process, and to note that she has a great reputation for guiding negotiations through to conclusion. Lisa has been very responsive in answering questions prior to this meeting with great thoughtfulness, and I know she is under considerable pressure to bring this much delayed process to a conclusion. I just hope that she and the rest of the folks here have the fortitude to stay with us through some additional adjustments that I think are required to make this Draft Ordinance worthy of guiding a city of Cambridge's prestige, excellence, intelligence, quality of life, multicultural vivacity, innovation and productivity through what promises to be a new decade of massive
I have also prepared a detailed mark-up of the ordinance, with suggestions and commentary, that I will submit to Lisa and the rest of the Task Force for review. (I’m sure they can’t wait to look at it.....!)
There are some curious inconsistencies in this ordinance. For instance,
1.) In the DLO’s Alternative Performance Standards section, a developer or property owner can choose to submit a plan in alignment with the LEED Light Pollution Credit guidelines - which are very clear and precise - OR, they can submit a plan that indicates
that there will be no more than 8 Lux emitted at the property line at 5 vertical feet and above. Now the reason this is an inconsistency - and a big one - - is that this 8 Lux figure is derived not from the LEED LPC standard which it is supposed to stand in for, but from the Model Lighting Ordinance’s...

Alternative Performance Standards, pg. 6-7:

"The maximum allowable vertical illuminance value shall be (8) lux at the perimeter of the lot.”
In the Model Lighting Ordinance, this table applies only to non-residential areas.

Table F. Maximum Vertical Illuminance at any point in the plane of the property line

<table>
<thead>
<tr>
<th>Lighting Zone</th>
<th>Lighting Zone 1</th>
<th>Lighting Zone 2</th>
<th>Lighting Zone 3</th>
<th>Lighting Zone 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05 FC or 0.5 LUX</td>
<td>0.1 FC or 1.0 LUX</td>
<td>0.3 FC or 3.0 LUX</td>
<td>0.8 FC or 8.0 LUX</td>
<td>1.5 FC or 15.0 LUX</td>
</tr>
</tbody>
</table>

Model Lighting Ordinance, pg. 32.

Table F. But in the Model Lighting Ordinance, this table only applies to non-residential, commercial areas, or what we are calling in the Cambridge Draft Ordinance,
According to the Model Lighting Ordinance, 8 lux should apply only to non-residential LZ 3 areas - the yellow ones on the map. So it is an error that this Draft Ordinance has 8 lux as the Alternate Performance alternate lux limit for the entire city, including the residential and mixed residential areas of LZ 2.
In the Model Lighting Ordinance, there is a limit of 3 lux at the property line for all Zone 2 areas – the white areas - that make up the majority of our city.
In the Model Lighting Ordinance, 3 lux would apply to the LZ 2 mixed residential areas.

You can see that here.
In truth, the more APPROPRIATE alternative light trespass standard for the Alternative Performance Standards - since it is substituting for the LEED Light Pollution Credit standard, should be the LEED Light Pollution Credit standard for trespass at the property boundaries – NOT the Model Lighting Ordinance. And the LEED LPC figure maximum is 2 lux for Zone 3 and 1 lux for Zone 2.
Here is the LEED trespass standard for Zone 3 – saying 2 LUX is the maximum
And, here is the standard for Zone 2 – saying 1 LUX maximum.
This kind of confusing mishmash of standards also occurs in the Draft Ordinance’s Prescriptive Standards.
Table E shown on page 5 of the Draft Ordinance is derived largely from
Model Lighting Ordinance prescriptive standards for residential properties only.

Model Lighting Ordinance, pg. 33.

the Model Lighting Ordinance's Table G - Prescriptive Standards for Residential – not commercial - areas.
MLO assumes just one fixture at entries and exits.

...there is the implicit assumption that there will be just ONE of each of these kinds of fixtures at the various entries and exits of a house....
...and the section has additional language ensuring the principle of no light trespass on neighboring properties.

But the larger problem, is that the Model Lighting Ordinance - and most other municipal lighting ordinances I've looked at - make a distinction between residential and commercial properties in their prescriptive standards.
They require commercial properties to first limit the total amount of flux - or illumination – that can be used on the entire property - using a formula like total lumens per square foot.
They also not only require that properties limit light spill above the horizontal line of the fixture, but that they also...
...limit glare and light trespass by limiting lumen emitted at the upper side angles -
- This is the colorful BUG rating system that Jeff Berg showed us last time we were here -
So, the issue with the Draft Lighting Ordinance Prescriptive table (that Peter Calkins and several others have pointed out) – is that – for the higher lumen values - ...it allows unlimited numbers of lights at 1050 lumens for walkways, open spaces, or buildings at up to 12 feet high...

### DLO Prescriptive Standards, pg. 5

<table>
<thead>
<tr>
<th>Outdoor Lighting Category</th>
<th>Maximum Initial Lumens Per Light Fixture</th>
<th>Maximum Height</th>
<th>Shifting and Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unshielded or partly shielded light fixture (general)</td>
<td>200–255</td>
<td>12 feet above the surface of the area to be illuminated</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Unshielded or partly shielded light fixture located in a front yard between the building and street</td>
<td>670</td>
<td>12 feet above the surface of the area to be illuminated</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Fully shielded or shielded directional light fixture for entries, walkways, open spaces or buildings</td>
<td>1,050</td>
<td>12 feet above the surface of the area to be illuminated</td>
<td>Must be fully shielded or directed away from all properties that are existing or located directly across a street</td>
</tr>
<tr>
<td>Fully shielded or shielded directional light fixture for automobile surface parking areas, driveways or outdoor loading bays</td>
<td>1,260</td>
<td>14 feet above the surface of the parking area, driveway or loading bay</td>
<td>Must be fully shielded or directed away from all properties that are existing or located directly across a street</td>
</tr>
</tbody>
</table>
as long as they are shielded from upglow – because that it how “fully shielded” is so far defined in this ordinance. However, they aren’t required to specifically be shielded against glare or trespass, just “directed away,” which is a fairly vague term.
In the Model Lighting Ordinance table, you can see that these lower rows are still dedicated to household lighting, NOT to commercial lighting, such as parking areas and stores.
However, in the Cambridge Draft Ordinance, when you move down to the bottom row in this Table, it seems to be providing a new set of standards for parking areas and loading bays – as if these areas where going to be deleted from the Zoning Ordinance, where they are currently regulated, including a proscription against light trespass, in Articles 6.41, 6.46, and 6.93 – which is not present in the language in the right column.

So this is a real mixing up of the the Model Lighting Ordinance’s intent that these particular prescriptive standards apply only to residential properties. And I think this is one of the things Charlie Teague was talking about when he said that the Draft Lighting Ordinance could actually undercut the protections we already have in the Zoning Ordinance.

The basic issue with this Draft Lighting Ordinance Prescriptive table (and Peter Calkins and several others have pointed this out) – is that – for the higher lumen values - it allows unlimited numbers of light fixtures at 12 or 14 feet for walkways, open spaces, or buildings, parking areas driveways, loading bays for all residences and commercial and industrial properties, as long as they are shielded from uplighting ABOVE the fixture...
..no matter where they are in the city, Zone 2 or Zone 3.

So how do we fix these problems and inconsistencies? I have several ideas: First of all, you can get rid of a lot of technical jargon and a lot of specifications if the prescriptive standards specify three things very clearly:
Core strategy (from LEED and US Pattern Light Code):

1. Limit total lumens as well as individual fixtures.
2. Limit uplight (with a few special exceptions)
3. Limit light trespass and glare on abutting properties and public ways.

Core strategy
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1. Limit total lumens as well as individual fixtures.
2. Limit uplight (with a few special exceptions)
3. Limit light trespass and glare on abutting properties and public ways.

It’s sort of like saying...

Hey, keep your noise, smoke, toxic waste, garbage, and glare to yourself. I don’t want it on my property where it is a nuisance and a health issue, or in public ways where it can blind me to other dangers.

And, I care enough about our city’s environment and energy conservation, that I don’t think it makes sense to try to light the night sky above us.
Maybe this is too simple for Cambridge, but this is how several municipalities did it:

(A) All nonexempt outdoor lighting fixtures shall be fully shielded.

(B) All nonexempt outdoor lighting fixtures shall be placed so as to not cause light trespass of glare beyond the property boundary.

(C) Any lamp installed on a residential property must be shielded such that glare from the lamp is not directly visible from any other residential property.

(D) All nonexempt outdoor lighting fixtures shall be of a type and placed so as to not allow any light above the horizontal, as measured at the luminaire.

(E) Flood or spot lamps must be fully shielded and aimed no higher than 45 degrees above straight down (half-way between straight down and horizontal) when the source is visible from any off-site residential property or public roadway.

(Madison, Mississippi)
(F) All lighting for commercial, industrial and any other non-residential activities, shall be extinguished between 11:00 p.m. (or when the business closes, whichever is later) and sunrise. Security lighting for these establishments shall conform with the other provisions of this ordinance.

(G) Commercial/industrial or business uses shall not exceed 70,000 lumens per acre.

(H) All light fixtures that are required to be shielded shall be installed and maintained in such a manner that shielding is effective as described herein for fully-shielded fixtures.

(I) Beyond the shielding requirements of this Ordinance, all light fixtures shall be located, aimed or shielded so as to minimize stray light trespassing across property boundaries.

(J) Multi-use lighting must conform to the shielding and timing restrictions, if any, that apply to most restrictive included use.

Now, this may not work for our city, BUT
Now that solution may not be the right one for Cambridge, but the point is that we want to focus on getting residents and developers to chose

Not only fully-shielded fixtures,...
...which prevent uplight and skyglow... but also fixtures that limit glare and trespass through directionality, total lumen limits, and additional shielding, such as cowls or hoods, or recessed lamp placement. You light what you need to light and let your neighbor deal with their own lighting. This is the simple protection most of the people who have testified at this meetings have asked for.
Next I would like to present some ideas about fixing the Draft Ordinance.

[These are in document “Discussed Favorably at the 9-16-15 Lighting Task Force Meeting” and in “Outdoor Lighting Ordinance DRAFT_2015_09_16-cl-edits.”]