

# Sea Level Rise Pop-Up Workshops: Summary Notes

Sixteen pop-up workshops held from August 26<sup>th</sup> to October 19<sup>th</sup>, 2019

## Overview and Purpose

As part of the comprehensive update to the Primary Urban Center Development Plan (PUC DP), the Department of Planning and Permitting (DPP) held a series of pop-up workshops during August, September, and October 2019 to solicit community feedback on the topic of sea level rise in the Primary Urban Center.

The goals of conducting the pop-ups were:

- Sharing information with interested residents regarding the existing impacts of sea level rise in the PUC
- Seeking community input on what policy responses DPP should pursue in the future
- Discussing the pros and cons of various physical interventions (adaptation to sea level rise)
- Informing the public about other PUC DP efforts

Our pop-up booths included informational materials, interactive voting exercises, and an opportunity to speak with City staff. To best serve the large population within the Primary Urban Center, the City and County of Honolulu held the 16 pop-ups workshops all across the area, from Waikīkī to Kakaʻako to School St. to Pearlridge.

Each of these events lasted approximately three hours and were publicized beforehand on the [www.pucdp.com](http://www.pucdp.com) project website in addition to being announced multiple times through the project email list and on DPP's social media outlets (Facebook and Twitter). These workshops represent the fourth major public outreach effort related to the PUC DP update process (the first being the pop-ups in Summer 2018, the second being the Vision Forum in November 2018, and the third being three land use + growth workshops in Summer 2019).

### WHAT IS A POP-UP?

A pop-up workshop is a rapid, public, temporary informational and interactive installation that takes place out in the community, complete with project information, handouts, and survey exercises. Pop-ups are staffed by City staff and project team members.



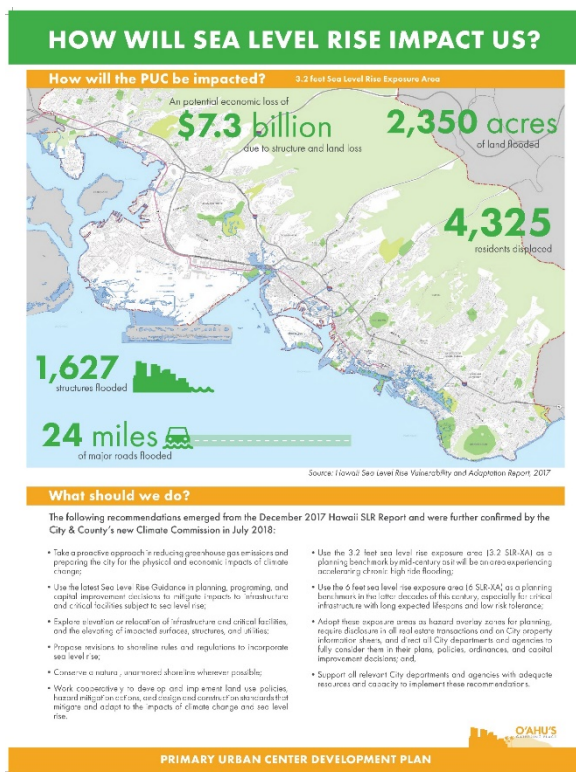
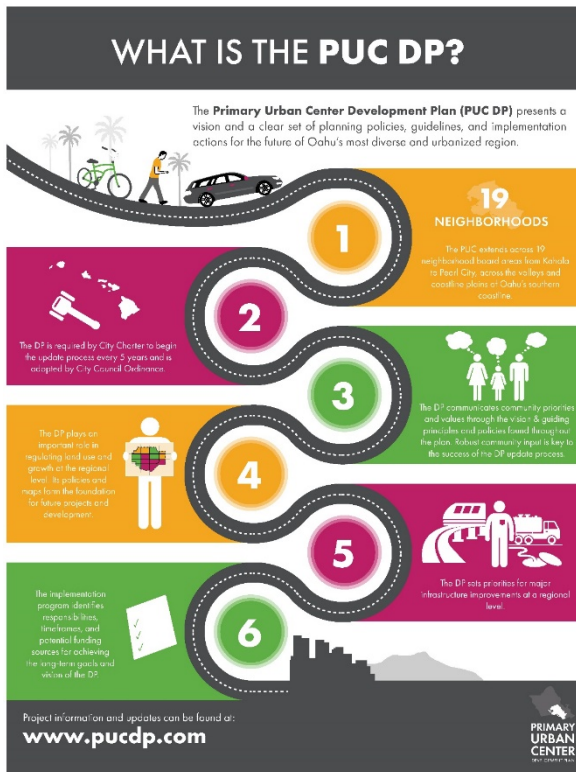
## Open House Materials

To solicit feedback, the team and DPP created large poster boards which were posted at each pop-up event for members of the public to read and interact with:

1. Overview of the project and the projected sea level rise impacts in PUC
2. Description of various physical and policy intervention strategies for responding to sea level rise, known as “adaptation”
3. Voting on adaptation strategies by placing dots/stickers along a spectrum, and leaving written post-it notes or freeform comments.
4. Educational and photographic information about the present-day extent of sea level rise flooding during “king tides” (exceptionally high tides)

Larger images of the boards are on following pages.

# Overview/Introduction





# Sea Level Rise Strategies and Voting Exercises

## POTENTIAL IN-LAND ADAPTATION STRATEGIES

### Restrict New Development

**Description**  
The City would establish physical benchmarks (i.e. number/frequency of flooding events or percentage of property loss) that trigger escalating development restrictions, if adaptation solutions and/or regional drainage plans have not been applied.

**Pros**

- Reduces risk to public safety
- Reduces risk to property loss
- Reduces risk to infrastructure

**Cons**

- Could cause economic loss
- May cause displacement of property
- May cause displacement of property

### Require District Drainage

**Description**  
The City would require all new development to include district drainage systems that are designed to handle increased rainfall and stormwater runoff.

**Pros**

- Reduces risk to public safety
- Reduces risk to property loss
- Reduces risk to infrastructure

**Cons**

- Could cause economic loss
- May cause displacement of property
- May cause displacement of property

### Raise Roads and Pipes

**Description**  
The City would raise roads and pipes to a higher elevation than the surrounding area to prevent flooding.

**Pros**

- Reduces risk to public safety
- Reduces risk to property loss
- Reduces risk to infrastructure

**Cons**

- Could cause economic loss
- May cause displacement of property
- May cause displacement of property

### Raise/Abandon/Repurpose 1st Floor

**Description**  
The City would raise the first floor of buildings to a higher elevation than the surrounding area to prevent flooding.

**Pros**

- Reduces risk to public safety
- Reduces risk to property loss
- Reduces risk to infrastructure

**Cons**

- Could cause economic loss
- May cause displacement of property
- May cause displacement of property

### Rapid Retreat (phased over 30 years)

**Description**  
The City would establish physical benchmarks (i.e. number/frequency of flooding events or percentage of property loss) that trigger escalating development restrictions, if adaptation solutions and/or regional drainage plans have not been applied.

**Pros**

- Reduces risk to public safety
- Reduces risk to property loss
- Reduces risk to infrastructure

**Cons**

- Could cause economic loss
- May cause displacement of property
- May cause displacement of property

### Slow Retreat (phased over 60 years)

**Description**  
The City would establish physical benchmarks (i.e. number/frequency of flooding events or percentage of property loss) that trigger escalating development restrictions, if adaptation solutions and/or regional drainage plans have not been applied.

**Pros**

- Reduces risk to public safety
- Reduces risk to property loss
- Reduces risk to infrastructure

**Cons**

- Could cause economic loss
- May cause displacement of property
- May cause displacement of property

### Adaptive Design Requirements

**Description**  
The City would establish physical benchmarks (i.e. number/frequency of flooding events or percentage of property loss) that trigger escalating development restrictions, if adaptation solutions and/or regional drainage plans have not been applied.

**Pros**

- Reduces risk to public safety
- Reduces risk to property loss
- Reduces risk to infrastructure

**Cons**

- Could cause economic loss
- May cause displacement of property
- May cause displacement of property

### Floodable Park

**Description**  
The City would establish physical benchmarks (i.e. number/frequency of flooding events or percentage of property loss) that trigger escalating development restrictions, if adaptation solutions and/or regional drainage plans have not been applied.

**Pros**

- Reduces risk to public safety
- Reduces risk to property loss
- Reduces risk to infrastructure

**Cons**

- Could cause economic loss
- May cause displacement of property
- May cause displacement of property

## POTENTIAL COASTAL ADAPTATION STRATEGIES

### Sea Wall/Revetment

**Description**  
A seawall or revetment is a hard engineering shore-based structure which protects the coast (and adjacent properties) from erosion, at least in the short term. Seawalls are commonly used in Hawaii.

**Pros**

- Protects property behind the shoreline
- Hard engineered solution that is tried-and-tested

**Cons**

- Leads to beach loss along eroding coasts
- Causes myriad environmental problems including loss of natural habitat
- Disrupts sediment movement and transport, causing long-term erosion
- High construction cost
- Disincentivizes public access

### Riprap Rock Armor

**Description**  
"Riprap" is man-placed rock or other loose material used to armor shorelines, piers, and other shoreline structures against scour, storm surges, and water erosion (usually constructed with large boulders in Hawaii).

**Pros**

- Cost roughly same as sea wall
- Requires little taking of land property
- Requires minimal maintenance once installed

**Cons**

- Not appropriate for many beaches
- Not as effective for storm surge
- Impacts on an eroding beach are generally the same as a seawall (beach loss) without other mitigation (e.g. beach nourishment)
- Has a large footprint into public trust submerged lands

### Natural or Living Shoreline

**Description**  
A protected, stabilized coastal edge made of natural materials like plants, sand dunes, and/or rock. Unlike a concrete structure, which impedes the growth of plants and animals, living shorelines grow over time. Often referred to as "soft armoring". Not usually compatible with most sandy beach environments.

**Pros**

- Allows coexistence with erosion and sea level rise over the long term
- Avoids most of the issues that arise from hard armoring

**Cons**

- Not typically used on beaches on the open ocean
- Relatively new and untested strategy in Hawaii used extensively in places like Chesapeake Bay

### Sand Nourishment

**Description**  
The practice of adding large quantities of sand or sediment to beaches to combat erosion and increase beach width. A "soft armoring" technique, but impermanent.

**Pros**

- Protects valuable beaches; preserves maximum beach area
- Avoids most issues caused by walls/revetments

**Cons**

- Requires significant dredging of sand
- Potential environmental risks to the nearshore marine ecosystem
- Repeat nourishment needed on a chronically eroding beach

## HOW DO WE ADDRESS SEA LEVEL RISE?

What new policies and regulatory approaches should be prioritized?

### ZONING CHANGES

**Immediately pausing increased density entitlements in the most severe sea level rise exposure areas.** In impacted areas, the City & County would pause rezoning for higher density until a detailed adaptation plan is developed by the City or by a district entity (such as a Business Improvement District or Community Facilities District).

NOT AT ALL

DEFINITELY

### DEVELOPMENT RESTRICTIONS

**Gradually restricting new development in the sea level rise impacted areas.** The City & County would establish physical benchmarks (i.e. number/frequency of flooding events or percentage of property loss) that trigger escalating development restrictions, if adaptation solutions and/or regional drainage plans have not been applied, and/or are proving ineffective with accelerating sea level rise.

NOT AT ALL

DEFINITELY

### RESILIENT DESIGN STANDARDS

**Establishing specific design standards and resiliency requirements for all new construction in SLR-XA areas.** For new development and major reconstructions (including post-disaster), the City & County would impose new regulations and design guidelines to ensure buildings can withstand 4 feet of sea level rise.

NOT AT ALL

DEFINITELY

### ADAPTATION FUNDING

**Raising the cost of public services and utilities in areas chronically impacted by flooding.** To account for the greater expense in providing and maintaining pipes, streets, wires, and other public infrastructure in SLR-XA areas, the City & County will increase the price accordingly for these services, and use this revenue to pay for resiliency and adaptation improvements.

NOT AT ALL

DEFINITELY

PRIMARY URBAN CENTER DEVELOPMENT PLAN

## HOW DO WE ADDRESS SEA LEVEL RISE?

What new policies and regulatory approaches should be prioritized?

### PRIVATE SEA WALLS

**Building sea walls to protect private property against sea level rise/flooding, even if it causes erosion.** The City & County has traditionally allowed individual owners to build and rebuild concrete sea walls, despite evidence that seawalls lead to beach loss on an eroding shoreline.

NOT AT ALL

DEFINITELY

### LOW IMPACT DEVELOPMENT

**Pursuing additional City-maintained Low Impact Development (LID) solutions.** The City & County will continue funding and constructing "green infrastructure" projects, such as bioswales, retention ponds, rain gardens, permeable pavements, green roofs, infiltration planters, and similar.

NOT AT ALL

DEFINITELY

### INCENTIVIZED RETREAT

**Encouraging coastal property owners to retreat to higher ground through City programs, incentives, and buy-outs.** The City & County would seek to strike deals with private property owners to buy land most threatened by sea level rise, or negotiate rolling easements (properties yield to the public interest by allowing wetlands or beaches to migrate inland gradually over time).

NOT AT ALL

DEFINITELY

### RESILIENT INFRASTRUCTURE

**Requiring that sea level risk analysis and vulnerability assessments be regularly conducted by infrastructure agencies.** The City & County would work with the various agencies (including those responsible for the water system, sewer system, and stormwater system) to ensure their capital improvement plans reflect the latest sea level rise modeling, adaptation guidance, and planning regulation.

NOT AT ALL

DEFINITELY

PRIMARY URBAN CENTER DEVELOPMENT PLAN



## King Tides Photos and Information

### WHAT SEA LEVEL RISE IMPACTS CAN WE SEE?



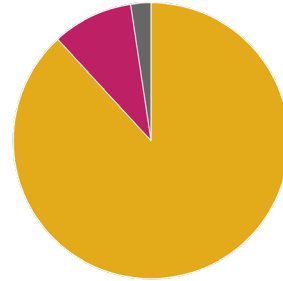
## Pop-Up Voting Results

The following adaptation strategies are ranked by their relative support amongst those who participated in the pop-up voting (which strategies received the most support?):

■ Yes ■ No ■ Unsure

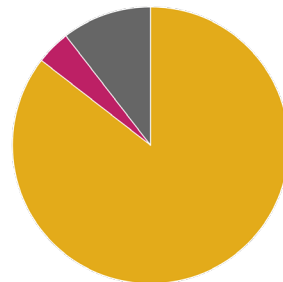
### Low-Impact Development (LID) Projects

Green infrastructure strategies had the highest overall support, with 90% yes votes. Example projects include bioswales, retention ponds, rain gardens, permeable pavements, green roofs, infiltration planters, and similar.



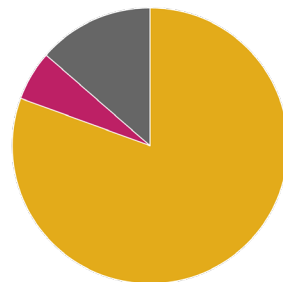
### Resilient Building Design Guidelines/Standards

Requiring new buildings in impacted areas to comply with specific sea level rise-oriented standards received strong support, with 85% yes votes. Unsure was fairly high.



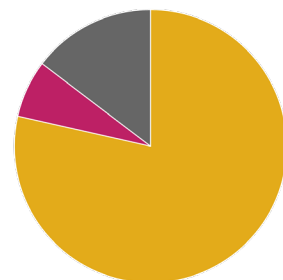
### Development Restrictions tied to Triggers

Establishing physical benchmarks (i.e. number/frequency of flooding events) that trigger escalating development restrictions received strong support, with 80% yes votes. Unsure was very high.



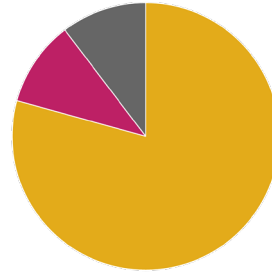
### Pausing Bonus Density in Impacted Areas

The concept of pausing rezoning for higher density until a detailed adaptation plan is developed by the City or by a district entity earned strong support, with 80% yes votes. Unsure was very high.



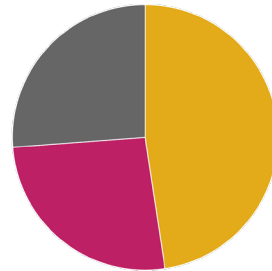
### Resilient Infrastructure

The premise of ensuring that capital improvement plans reflect the latest sea level rise modeling, adaptation guidance, and planning regulation received strong support, with 80% yes votes.



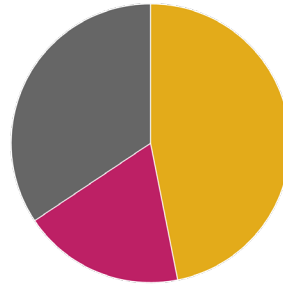
### Incentivized Retreat

On the question of whether the City should buy private land most threatened by sea level rise, response was very mixed, with only half voting yes. Both No and Unsure was over one-quarter, perhaps reflecting concern over the cost of this action.



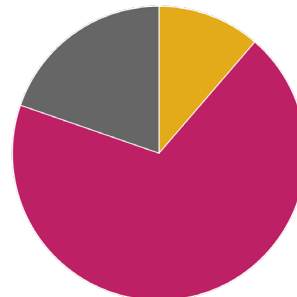
### New Adaptation Funding

Similar to the above strategy, response was very mixed. Unsure was particularly high, reflecting a need to educate the public about the costs and trade-offs of adaptation.



### Private Sea Walls

Opposition was very strong to continue allowing individual owners to build and rebuild concrete sea walls despite evidence that seawalls lead to beach loss, with 80% no votes. Unsure was fairly high.



# Conclusion

## Voting/Strategy Prioritization Results

**The strongest support was for green infrastructure, design standards, and development restrictions.**

- Low Impact Development (LID) had the strongest support at 90%
- Resilient design standards, benchmarks for development restriction, and pausing zoning entitlements until a comprehensive adaptation strategy is developed, all received over 75% “yes” votes

**Less popular strategies were those that had the potential to cost significant public money, have equity impacts, or were relatively complex “wonky” concepts.**

- The adaptation funding and incentivized retreat questions received the most split votes.
  - Equity was often brought up as a concern for both of these strategies.
- The incentivized retreat question may have been unclear.
- Private sea walls were by far the least popular adaptation strategy due to the toll on beaches

**It is hard to know if the zoning and development restriction questions were strongly favored as strategies on their own, or influenced by an “enough is enough” sentiment toward development in general.**

- Development fatigue has been expressed by residents at all past outreach events, including this one.
- Some expressed concerns about the placement of some existing and planned development regarding SLR

## Other SLR Strategies and Issues

**The conversation around sea level rise should be comprehensive, and relate directly to day-to-day issues that residents are already experiencing, such as nuisance flooding.**

- Some talked about greater environmental sensitivity and also promoting Native Hawaiian environmental management techniques
- Stream flooding and the Ala Wai project were often raised as related issues

## General Comments

**These pop-ups clearly identified a need to continue educating around SLR issues, to raise awareness of the impacts, the potential solutions, and the trade-offs of difficult decisions.**

- Many people said the questions were hard and recognized that there are no easy answers and many trade-offs involved.
- Some did not feel “informed enough” about the issues to answer our questions.



## **Attachment A: List of All Pop-Ups**

**Pop-Up #1:** Kamehameha Shopping Center, Times Supermarket  
1620 N School Street

**Monday, August 26th, 11:00am - 1:00pm**

**Pop-Up #2:** University of Hawai`i, Welcome Back Fair  
Campus Center, 2465 Campus Road

**Tuesday, August 27th, 9:00am - 1:00pm**

**Pop-Up #3:** Lanakila Multipurpose Senior Center  
1640 Lanakila Road

**Thursday, August 29th, 8:30am - 11:30am**

**Pop-Up #4:** Pearlridge Center, Farmer's Market  
98-1005 Moanalua Road

**Saturday, August 31st, 8:00am - noon**

**Pop-Up #5:** McCully-Mo'ili'ili Public Library  
2211 South King Street

**Tuesday, September 3rd, 10:00am - 1:00pm**

**Pop-Up #6:** Honolulu Community College, Get It! Fair  
874 Dillingham Blvd

**Thursday, September 5th, 9:30am - 12:30pm**

**Pop-Up #7:** Hawai'i State Art Museum, First Friday  
250 South Hotel Street

**Friday, September 6th, 6:00pm - 9:00pm**

**Pop-Up #8:** Kaimuki Public Library  
1041 Koko Head Ave

**Monday, September 9th, 1:30pm - 4:30pm**

**Pop-Up #9:** Fort Street Mall, Farmer's Market  
1032 Fort Street Mall

**Tuesday, September 10th, 10:00am - 1:00pm**

**Pop-Up #10:** Kapi`olani Community College, Farmer's Market  
4303 Diamond Head Rd

**Tuesday, September 10th, 4:00pm - 7:00pm**

**Pop-Up #11:** International Marketplace, Waikiki Fall Fest  
2330 Kalakaua Ave

**Saturday, September 14th, 4:00pm - 10:00pm**

**Pop-Up #12:** PARK(ing) Day Parklet with SSFM  
Intersection of Auahi Street and Coral Street, Kaka'ako  
**Friday, September 20th, 9:00am - 1:00pm**

**Pop-Up #13:** 18th Annual Native Hawaiian Convention  
Hawai'i Convention Center, 1801 Kalakaua Avenue  
(as part of the convention "Marketplace")  
**Tuesday, September 24th, 10:00am - 2:00pm**

**Pop-Up #14:** Impact Hub, Climathon Sustainable Marketplace  
1050 Queen Street  
**Thursday, September 26th, 5:30pm - 8:00pm**

**Pop-Up #15:** Waikiki Community Center  
310 Paoakalani Ave  
**Tuesday, October 8th, 10:00am - 2:00pm**

**Pop-Up #16:** Queen Emma Square, Land and Sea Festival  
1275 Queen Emma Street  
**Saturday, October 19th, 9:00am - 1:00pm**



## Attachment B: Raw Count of Pop-Up Input

	Pause Zoning Entitlements			Development Restrictions			Resilient Design Standards			Adaptation Funding		
	Yes	Unsure	No	Yes	Unsure	No	Yes	Unsure	No	Yes	Unsure	No
8/26/2019 Kamehameha Shopping Center	n/a missing board			n/a missing board			n/a missing board			n/a missing board		
8/27/2019 UH Manoa Welcome Back Fair	10	3	2	12	3	1	14	3	1	10	2	4
8/29/2019 Lanakila Senior Center	11	0	0	9	2	1	11	0	0	9	3	0
8/31/2019 Pearlridge Farmer's Market	7	0	2	8	0	1	8	1	0	4	4	1
9/3/2019 McCully Moiliili Library	7	0	0	7	2	0	8	0	0	6	1	1
9/5/2019 Honolulu Community College	4	2	0	5	1	0	5	1	0	1	4	1
9/6/2019 Hawaii State Art Museum	22	2	2	29	2	0	24	3	0	13	11	1
9/10/2019 Kaimuki Public Library	7	5	2	12	3	0	11	2	0	4	5	5
9/10/2019 Fort Street Mall	16	1	1	15	2	3	17	0	3	7	7	7
9/10/2019 KCC Farmer's Market	7	0	0	7	0	0	7	2	0	3	0	1
9/14/2019 Waikiki Fall Fest	13	1	1	12	1	2	13	0	2	5	3	6
9/20/2019 Parking Day	3	5	2	5	5	2	9	3	0	11	1	0
9/24/2019 Native Hawaiian Convention	6	1	0	7	0	2	7	0	0	0	5	2
9/26/2019 Impact Hub	10	4	1	13	1	0	14	1	0	8	5	0
10/8/2019 Waikiki Community Center	17	0	0	16	0	0	15	1	1	7	6	3
10/19/2019 Land and Sea Festival	10	4	0	9	6	0	8	4	1	2	9	4
<b>Totals</b>	<b>150</b>	<b>28</b>	<b>13</b>	<b>166</b>	<b>28</b>	<b>12</b>	<b>171</b>	<b>21</b>	<b>8</b>	<b>90</b>	<b>66</b>	<b>36</b>

	Private Sea Walls			Low Impact Development			Incentivized Retreat			Resilient Infrastructure		
	Yes	Unsure	No	Yes	Unsure	No	Yes	Unsure	No	Yes	Unsure	No
8/26/2019 Kamehameha Shopping Center	2	0	7	8	1	0	5	0	4	8	1	0
8/27/2019 UH Manoa Welcome Back Fair	1	0	13	11	4	1	9	3	4	12	2	2
8/29/2019 Lanakila Senior Center	1	5	6	9	1	0	5	1	4	10	0	0
8/31/2019 Pearlridge Farmer's Market	1	2	6	7	2	0	3	3	3	5	1	2
9/3/2019 McCully Moiliili Library	0	2	7	9	0	0	5	3	1	9	1	0
9/5/2019 Honolulu Community College	0	0	6	6	0	0	5	0	1	6	0	0
9/6/2019 Hawaii State Art Museum	0	8	23	28	5	0	17	10	5	21	6	0
9/10/2019 Kaimuki Public Library	5	4	6	14	0	1	3	8	3	10	3	1
9/10/2019 Fort Street Mall	3	0	15	16	0	3	9	2	9	19	0	1
9/10/2019 KCC Farmer's Market	1	0	4	7	0	0	4	2	0	6	0	0
9/14/2019 Waikiki Fall Fest	0	2	13	14	0	0	7	6	2	13	0	1
9/20/2019 Parking Day	3	0	9	10	2	0	7	1	4	9	3	0
9/24/2019 Native Hawaiian Convention	1	2	5	5	2	0	2	1	5	8	0	0
9/26/2019 Impact Hub	0	5	7	15	0	0	3	7	3	0	0	13
10/8/2019 Waikiki Community Center	5	4	7	16	2	0	11	2	5	16	2	0
10/19/2019 Land and Sea Festival	0	6	6	11	1	0	5	6	2	9	2	1
<b>Totals</b>	<b>23</b>	<b>40</b>	<b>140</b>	<b>186</b>	<b>20</b>	<b>5</b>	<b>100</b>	<b>55</b>	<b>55</b>	<b>161</b>	<b>21</b>	<b>21</b>