Assessing Public Open Space Design to Support Seismic Resilience: A Case Study on Anchorage, Alaska

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EXECUTIVE SUMMARY

Currently, almost 3 billion people live in areas with high risk of seismic activity and by 2050, it is estimated that populations in major cities at risk of earthquakes will double. Public open spaces are considered safe havens during and in the aftermath of earthquakes. Research has shown that in the event of an earthquake, displaced populations spontaneously assemble on various open spaces to keep themselves safe, including sports fields, public plazas and underdeveloped land. Insufficient public open space or inadequately resilient open space design in seismically prone urban environments can lead to injury and death following earthquakes.

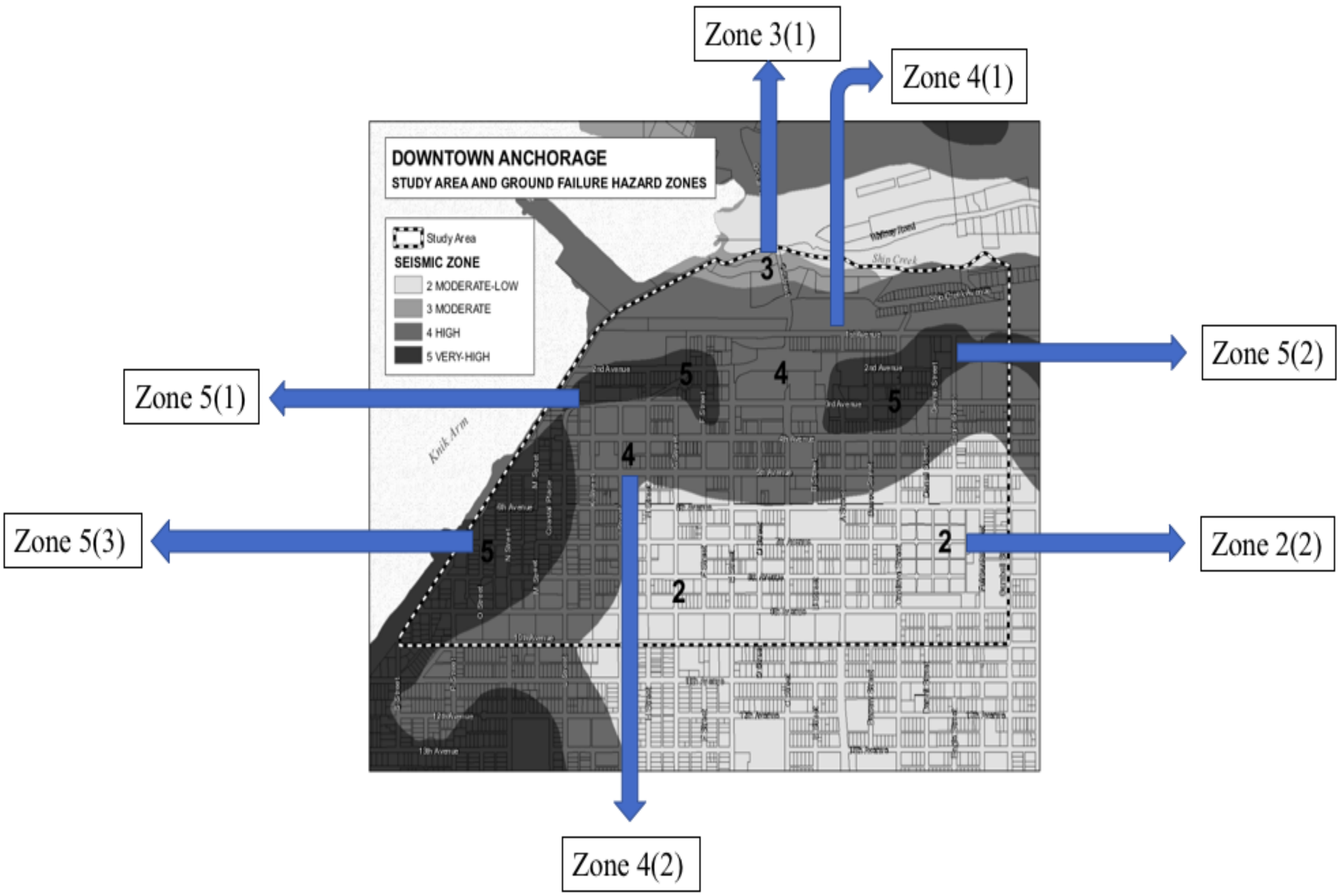
Design disciplines such as urban planners, landscape architects and urban designers can play a helpful role in improving seismic resilience through considering local issues, and making subsequent evidence-based recommendations for sustainable long-term development. However, the current seismic mitigation protocol predominantly focuses on engineering strategies, such as retrofitting buildings and replacing damaged structures as quickly as possible in lieu of the provision of seismically resilient public open spaces. Sufficient and accessible public open spaces in seismically vulnerable locations can result in either life or death following an earthquake. This, coupled with evidence suggesting that urbanization in earthquake prone environments is continuously increasing highlights a pressing demand for more research regarding the resilience assessment of public open space features.

Anchorage, Alaska is a location at particular risk of earthquakes and the subsequent shocks that ensue on account of its geographic location in the Pacific Ring of Fire. The active tectonism of the region leaves the area susceptible to megathrust earthquakes, such as the 9.2 magnitude earthquake of 1964. In addition to its geography, Anchorage is highly susceptible to the effects of earthquakes on account of the area's dense urban environment. This density results in greater vulnerability of building collapse; loss of critical utilities such as electricity and water; loss of communicative abilities; impeded evacuation routes and unavailable medical services. Additionally, the Municipality of Anchorage is expected to experience its most significant population influx in the city's history, where the decision makers of the Anchorage Downtown Comprehensive Plan expect more than 90,000 new residents between 2002 and 2025, further densifying the environment and increasing seismic risk.

Therefore, this study aimed to investigate the degree of seismic resilience in Anchorage, Alaska to make recommendations per the *Designing public open space to support seismic resilience* model's six key themes of open space seismic resilience. The model provides a framework entailing design strategies to meet basic human necessities as well as seismically resilient qualitative elements to open space functionality following an earthquake. The key

themes of the model are as follows: multifunctionality, networks, location and suitability, size and function, site elements and social resilience.

Through the results of the literature scan, policy scan and in-depth site analysis, it was recommended that the Municipality of Anchorage focus on two particular elements of improving local seismic resilience. First it is recommended that municipal administration look to improve the multifunctional capacity of downtown Anchorage through increased usage of available parking spaces, improving lighting and wayfinding downtown and promoting more vibrancy in



the downtown area. Second, it is recommended that Anchorage administration look to preserve and expand existing spaces in the most seismically vulnerable area of Anchorage, downtown seismic zone 4(2) (please refer to map below).

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