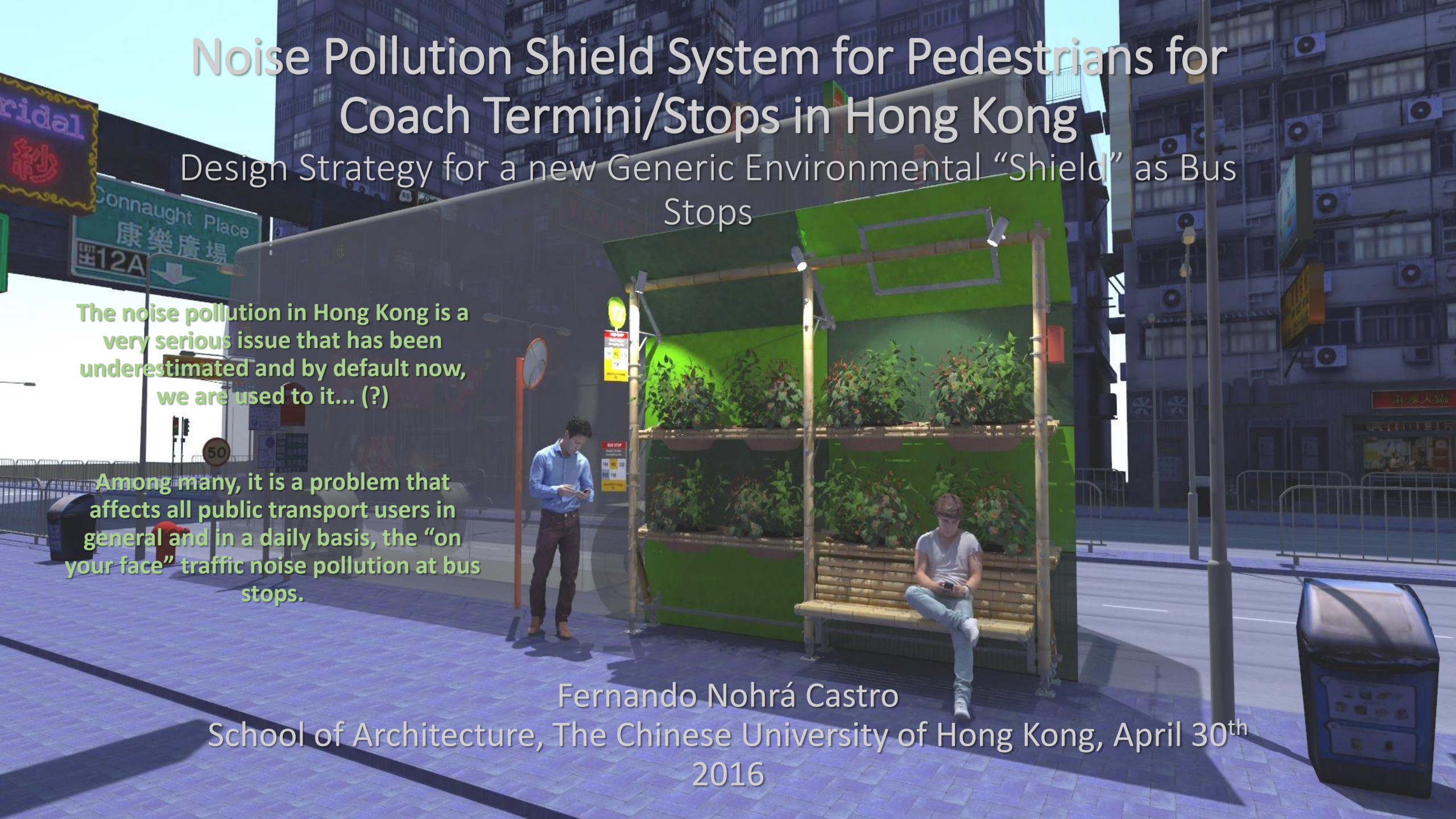
Noise Pollution Shield System for Pedestrians for Coach Termini/Stops in Hong Kong

Design Strategy for a new Generic Environmental "Shield" as Bus Stops



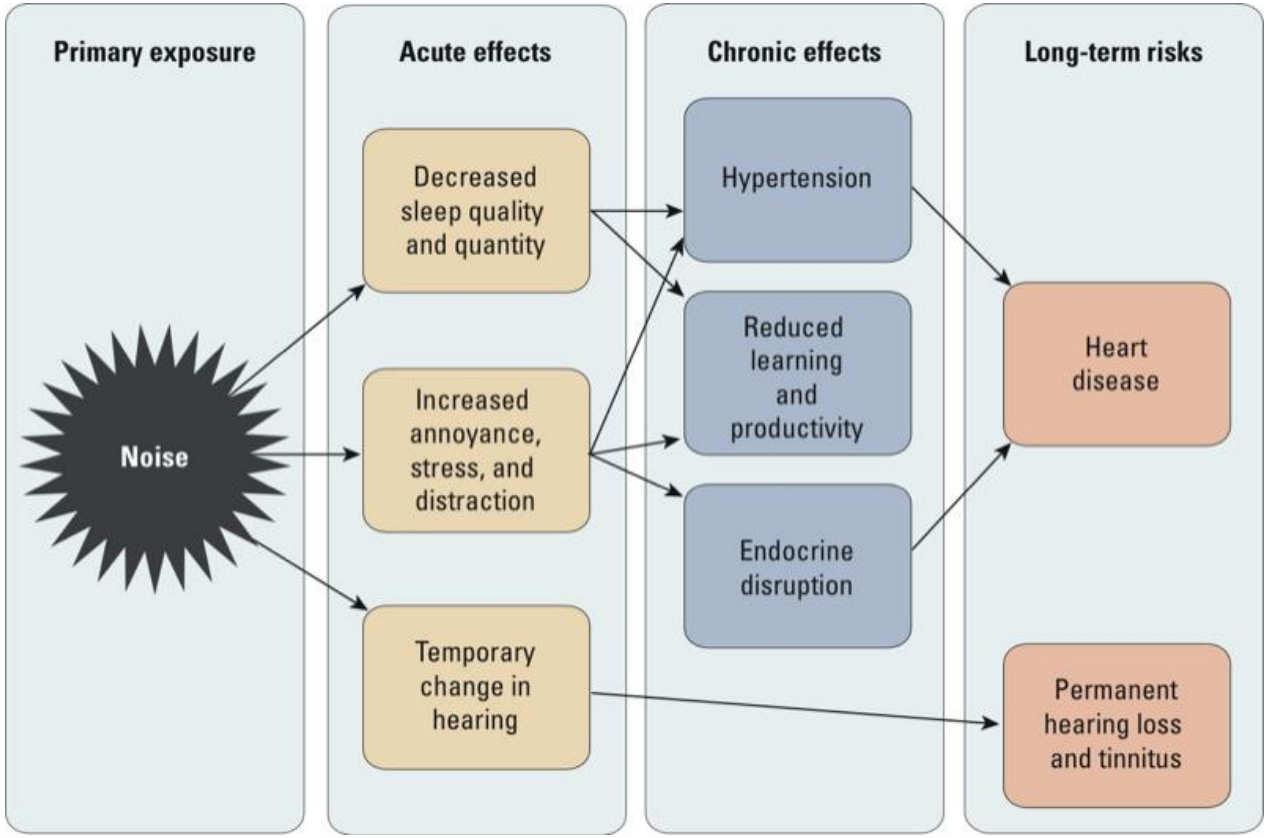
The noise pollution in Hong Kong is a very serious issue that has been underestimated and by default now, we are used to it... (?)

Among many, it is a problem that affects all public transport users in general and in a daily basis, the "on your face" traffic noise pollution at bus stops.

Fernando Nohrá Castro
School of Architecture, The Chinese University of Hong Kong, April 30th 2016

“Chronic Noise: A Biopsychosocial Model of Disease”

Environmental Health Perspectives, ehp.gov.com



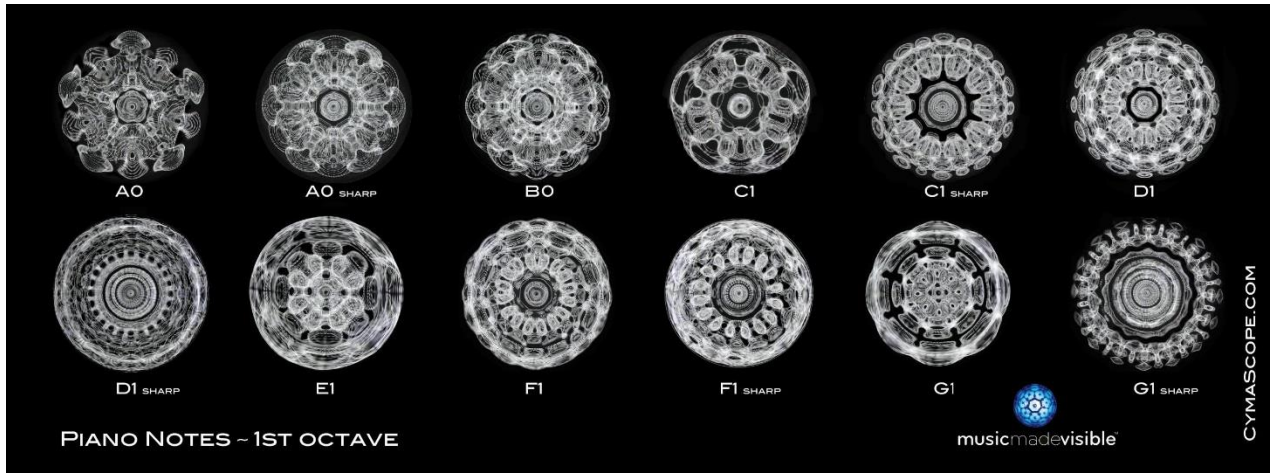
... the inexpensive and sustainable close contact with nature is so beneficial even though, quote: “physicians have begun to suggest that nature including its tool for dampening the impact of illness, and dulling the common intrusion of today’s mayor discomforts and stress.”

Source: http://www.theatlantic.com/health/archive/2013/03/how-nature-resets-our-minds-and-bodies/274455/

Sight isolates, sound incorporates. Whereas sight situates the observer outside what he views, sound pours into the hearer.

I am at the center of my auditory world, which envelopes me, establishing me at a kind of core of sensation and existence… By contrast with vision, the dissecting sense, sound is thus the unifying sense.

Source: Resonance: Essays on the Intersection of Music and Architecture. Vol.1 Muecke/Zach - Cilucidae Architectural Press 2007



OUR ENVIRONMENT UNCONSCIOUSLY YET DRAMATICALLY SHAPES THE JUDGMENTS AND DECISIONS WE MAKE EVERYDAY

Various studies have proven that the perception of the environment is 'intersensory'. However, studies analyzing the response of the population to the sound environment rarely consider the influence of other sensory information from the environment and in that response; the visual and aural stimuli are present individually and in combination.

- Immediate noise pollution in the Cheung Sha Wan Rd. pedestrian population (focused study) and its impact reflected in the Hong Kong bus users.

- EPD says that more than one million people are affected by the excess of traffic noise alone making it the biggest noise problem in the SAR

- Neighborhood type noise like motor vehicles supposed to meet specific noise emission standards.

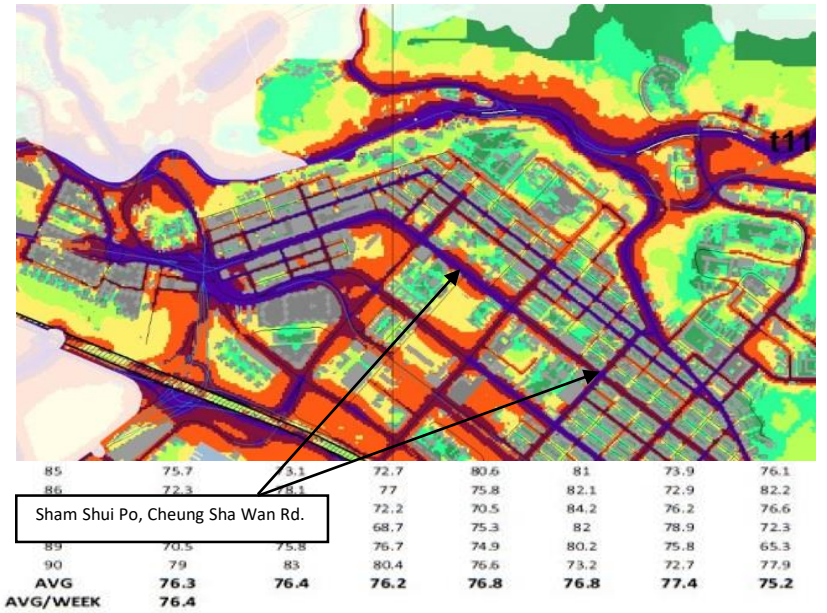
- Coaches and double decker busses generates the highest noise pollution to immediate users while queueing for the service.

IT IS NOT NEW... on 2002 the Department of Mechanical Engineering, Hong Kong University of Science & Technology, concludes, after have conducted an exhaustive roadside noise survey in heavily 'built-up' urban areas in 1999, that high L_{10} noise levels from 73.4 dBA to 91.4 dBA were recorded where a total traffic flow was between 540 and 4836 vehicles per hour in 18 major roads with continuous tall buildings (10 stories or more) flanking on both sides of the roads.

TABLE V. Traffic data, the measured L_{10} noise levels, and the predicted L_{10} noise levels using Eq. (3).

Site no.	Road	Hourly total veh. Q	Hourly heavy veh. H	% of heavy veh. P	Ave. speed (km/h) V	Measured L_{10} (dBA)	Predicted L_{10} using Eq. (3) (dBA)	Difference
N1	Hennessy Road	984	552	56.1	26.9	82.9	79.9	−3.0
N2	Des Voeux Road	780	492	63.1	26.3	81.9	78.6	−3.3
N3	Lai Chi Kok Road	1088	332	30.5	35.9	79.4	76.7	−2.7
N4	Cheung Sha Wan Rd	2692	1031	38.3	31.7	84.9	85.2	0.3
N5	Nathan Road	1604	524	49.2	30.8	80.9	81.0	0.1
N6	Waterloo Road	1412	260	18.4	30.4	78.4	78.3	−0.3
N7	Kwun Tong Road	3144	1124	35.8	34.9	81.9	85.5	3.6
N8	Ma Tau Chung Rd	1920	560	29.1	36.9	78.4	80.7	−2.3
Mean								−0.9
Sample standard deviation								2.4

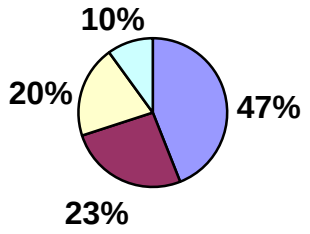
Fig.4 TABLE V. Source: A Multiple regression model for urban traffic noise in Hong Kong. W.M. To and Rodney C. W. Ip. Gabriel C.K. Lam and Chris T. H. Yau, 2002 Acoustical Society of America.



Result for SML Measurement Points at Actual Bus Stops in dB(A).

Total Average/Week: **76.4 dB(A)**

*Peak Hours



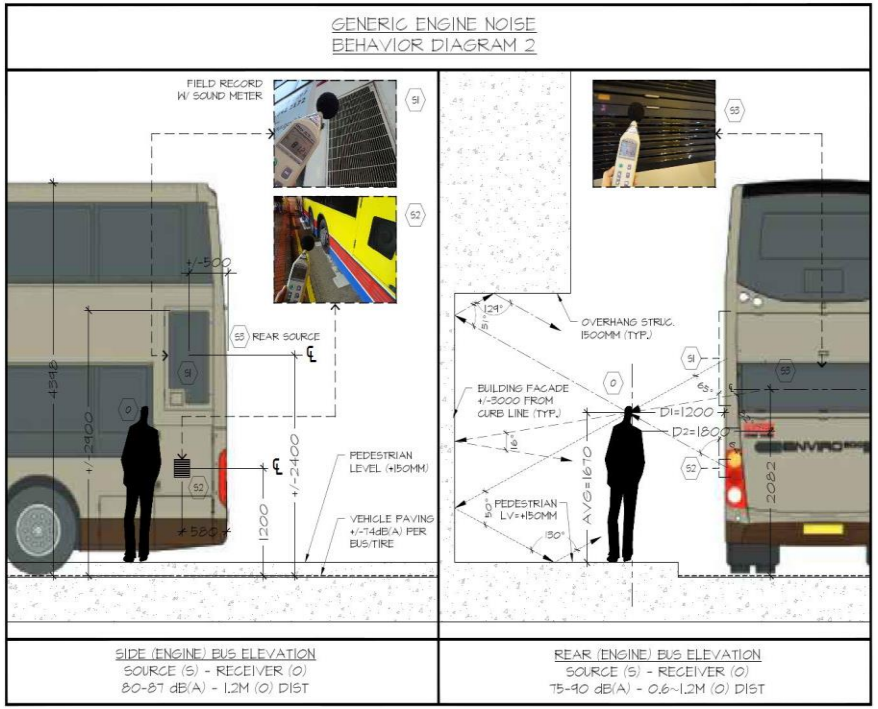


Fig.9. Pair two Japanese warrior with shield bronze sculpture. Source: http://www.terapeak.com/

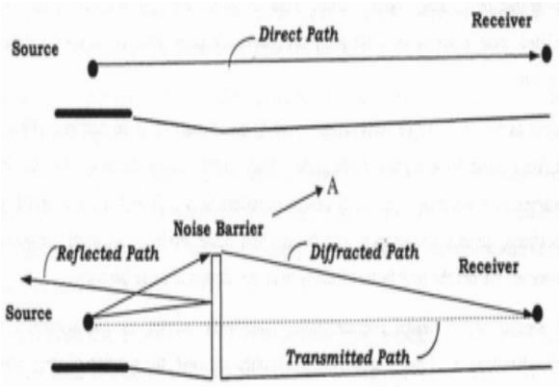
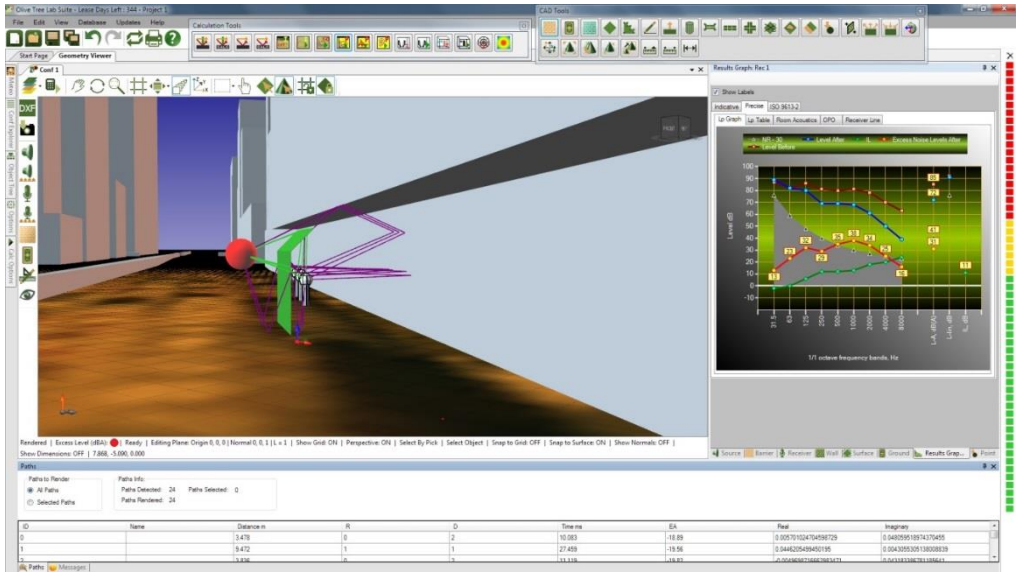


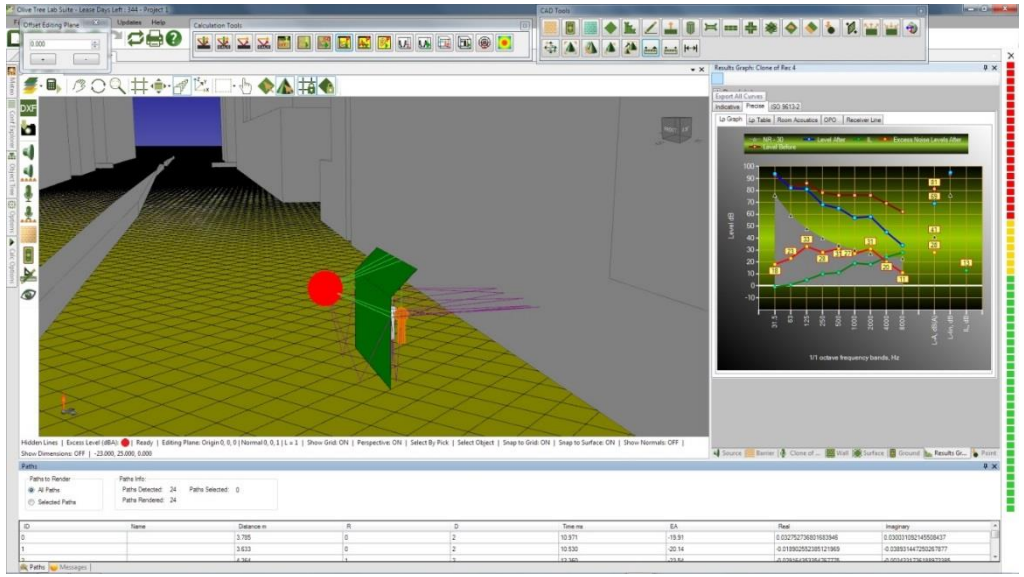
Fig.8.1 Alteration of Noise Paths by a Noise Barrier

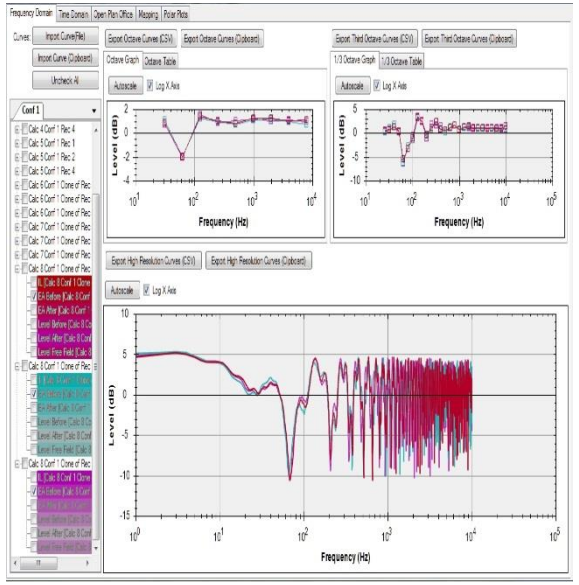
The Shields act as a direct demonstration of defense and the fact to bear it on, creates some of the attention that people need, helping them to –re-create- their ‘cosmovision’… because unconsciously you have been, on purpose, protected of something you recognize is a threat but as soon you don’t step on their physical and speed boundaries you are safe. But used to it, the humans allowed the sound pollution traffic spread to go beyond and appropriate the space way beyond physical boundaries.

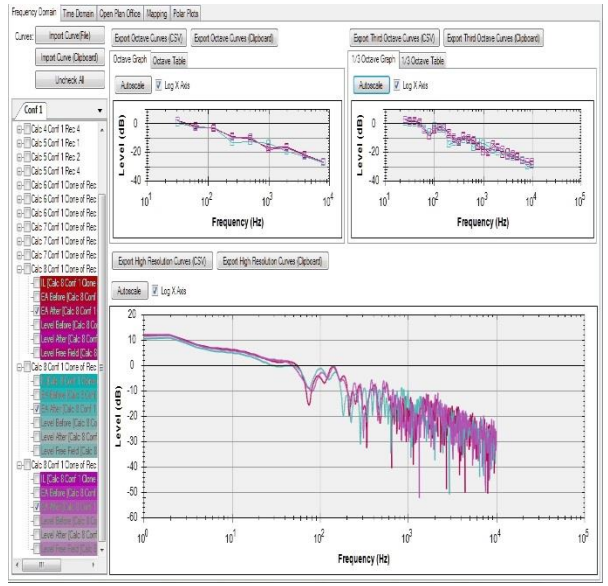
Fig.11. 3D model Sham Shui Po, Cheung Sha Wan Rd.

Fig.13. Simulation Enlarged Scenario 1









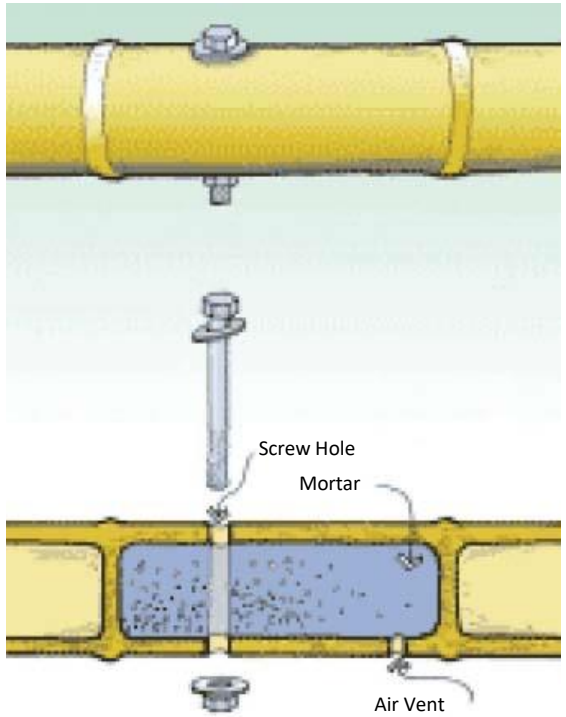
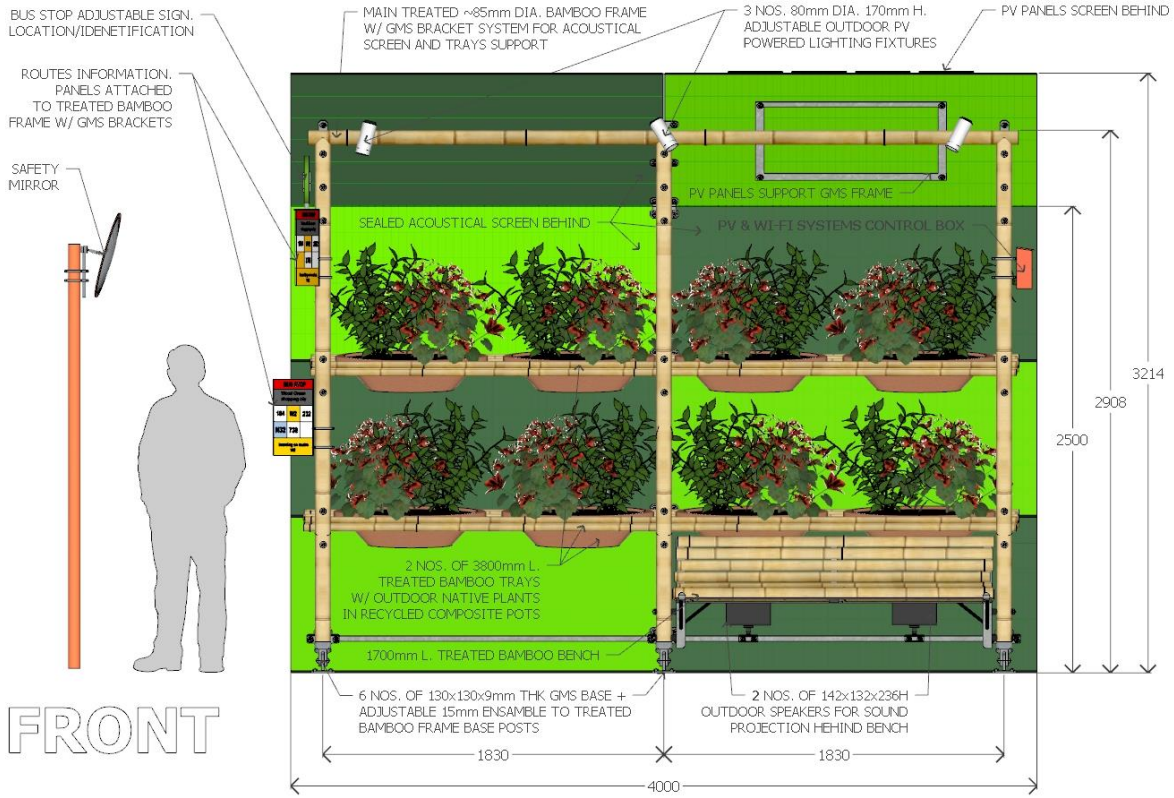
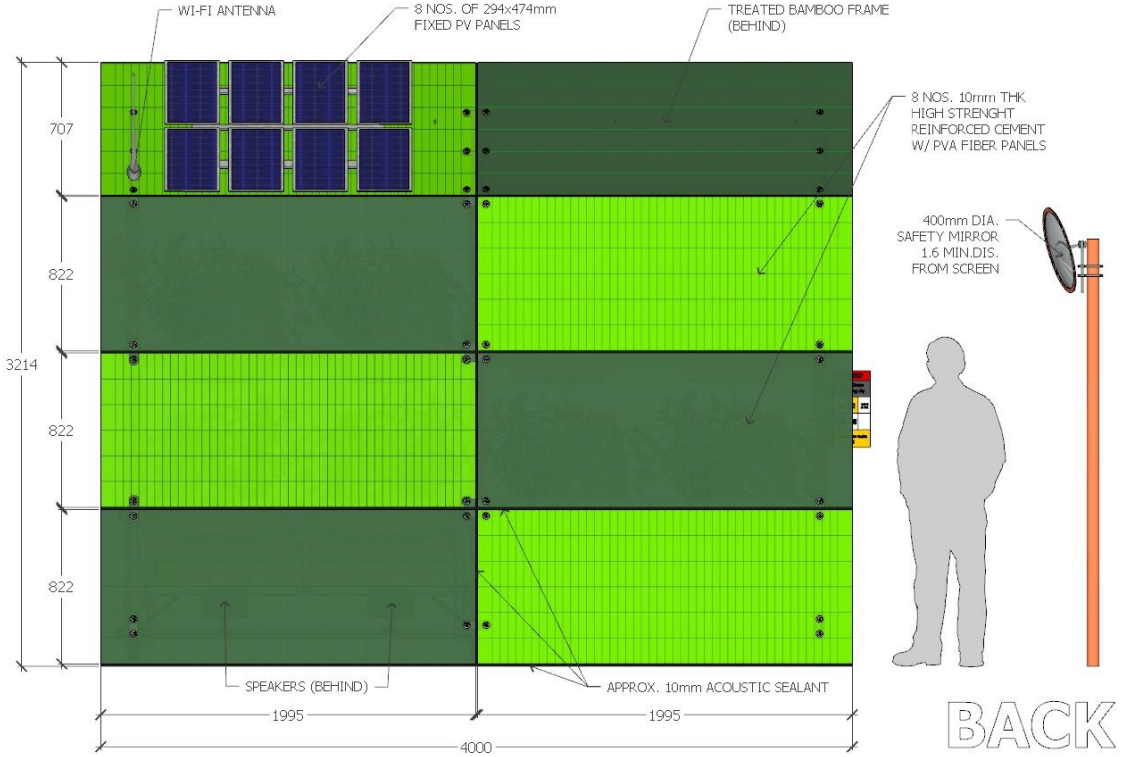


Fig.24. Detail for Typical Bamboo Stem Treatment[14]

Fig.27. Detail Bonding Anchor Type. Simon Velez[14]

PVA raw panels





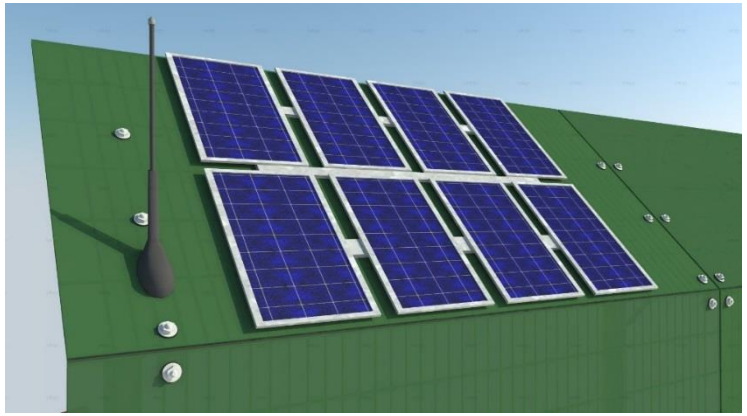


Fig.35. Photo Voltaic Panels and Wi-Fi Antenna

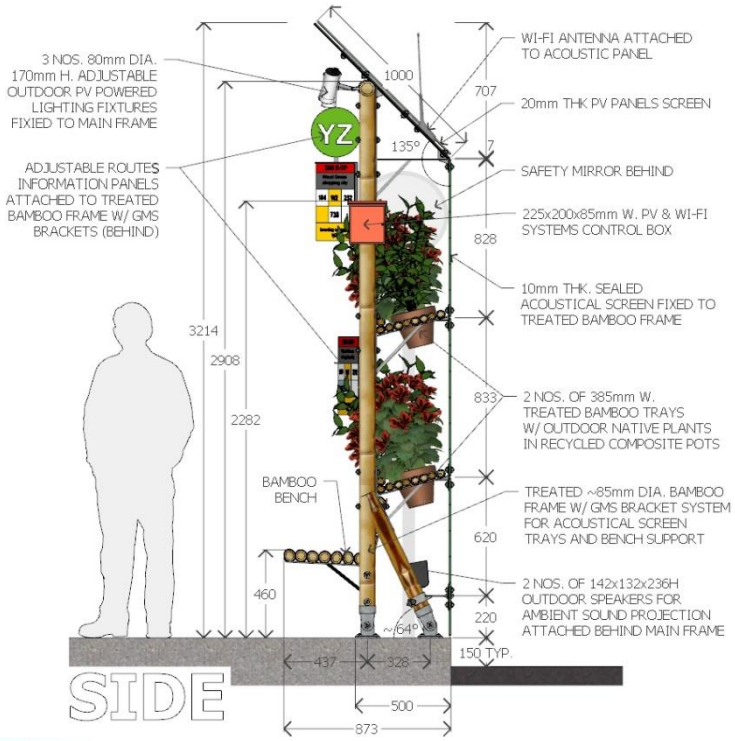


Fig.38. (Mirrored) PV Panels Supporting Stainless Steel Frame behind PVA Upper Panel and Lighting Fixtures Attachment to Treated Bamboo Frame. Front View.

Fig.41. Detail for Fixed Bench Frame Attached to Main Frame.
Speakers Support Beam Behind with GMS Attachment Detail to Main Frame Back Support Legs
Tray Typical GMS Bracket Only for Lower Tray Support and Lower PVA Screen.

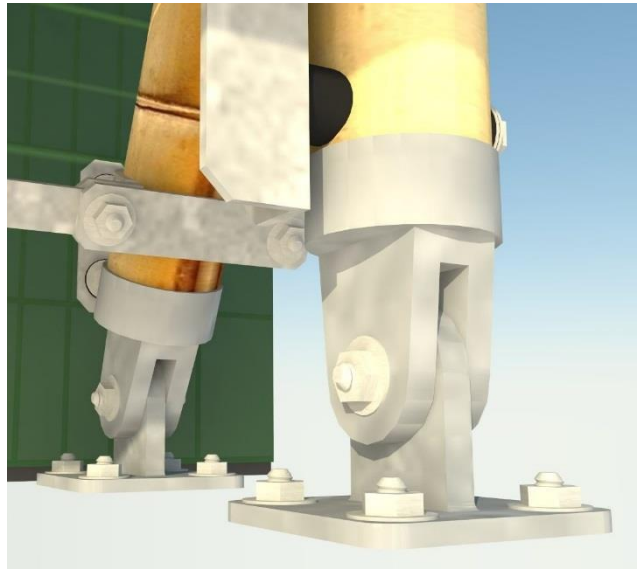


Fig.44. Detail of Main Bamboo Frame to Adjustable GMS Fixing Point to Paving.

I believe that we, designers, have to be creative and innovative using the resources that cause the minimum impact to the environment and move based and towards the people needs. The society is a living entity that requires care but their voice, education and respect in how to use and how demand for better contributions is within our own hands and senses, all as one, as ‘intersensory’ beings.

A full plan to “deny” traffic noise pollution in Hong Kong should be priority for future development of stronger policies, and small efforts, are the key to people to encourage them to become participants in the change and stop waiting for others to do these changes in their behalf.


THANK YOU!! ☺