Using Social Mapping in Collaborative Landscape Design for the San Diego Housing Commission

Juli Beth Hinds, AICP; Alison T. Pau; En-Chia Hsieh; Kelly Banh

Department of Urban Studies & Planning, University of California San Diego, La Jolla, California, USA

9500 Gilman Drive, MC 0517, La Jolla, CA 92092-0517; jhinds@ucsd.edu; 802-324-5760 (m)

Amanda Sousa

Housing Programs Manager, Real Estate – Finance and Portfolio Management Department; San Diego Housing Commission, San Diego, California, USA

Kyle Simon, PLA

Simon Landscape Architecture, San Diego, California, USA

Using Social Mapping in Collaborative Landscape Design

Social mapping is a flexible means of promoting citizen participation in the design of shared spaces. Effective design and implementation of social mapping exercises can overcome socioeconomic and literacy barriers and allow citizens to provide meaningful input based on personal experience and knowledge of neighbourhood and site dynamics. As part of a comprehensive redesign of the landscape at a senior affordable housing complex owned and managed by the San Diego (CA) Housing Commission, social mapping materials and directions were provided to 242 resident households following community informational meetings. Individual maps from 34 respondents and the property wide social map assembled from individual responses provided essential insights into residents' perceptions and uses of space, especially around potential strategies to re-introduce community gardening on the property. The results provide important insights into the design of meaningful and effective public participation in landscape design for collectively-managed spaces.

Keywords: social mapping; landscape; community agriculture; xeriscape; greywater; participation; participatory planning; bi-directional learning

Introduction

The practice of social mapping incorporates a broad range of means by which citizen-derived information is conveyed spatially (Soudappan et al. 2012). Social mapping is a broad term that may include many different forms of crowd-sourced data, but fundamentally involves participation by multiple users in the generation of a spatial representation (i.e. map), rather than the consumption of spatial information prepared by others. Social mapping is a powerful means of *bi-directional learning*, a process that may both promote organizational innovation, and offer effective and meaningful engagement with disadvantaged communities (Redko et al. 2016). As evidenced in this case, social mapping also represents one means (among many) to enable and elicit resident participation, engagement, and bi-directional knowledge sharing in the design of shared landscape spaces.

Drought as an Impetus for Landscape Planning

Landscaped areas in and around public and publicly-managed housing in the United States represent important and often neglected green spaces, despite serving over 1.2 million households living in the nation's public housing units (United States Department of Housing and Urban Development, 2020). It is well established that the design, composition, and maintenance of these green spaces has measurable and substantial impacts on residents' safety, health, and experience (Cook et al., 2012; Heyen et al., 2006). In water-short climates, choices around these green spaces also have significant bearing on water consumption and sustainability.

In 2015, the San Diego Housing Commission (SDHC), the housing authority for the City of San Diego, California, became "Exhibit A" in the challenge of balancing landscape water consumption with maintenance of beneficial community green space. The period from fall 2011 to fall 2017 was the driest on record in California since record keeping began in 1895, with 2014 and 2015 representing the two hottest years with respect to average temperature in California's recorded history (Hanak et al. 2015). Water users in California were confronted with the State's first mandatory water restrictions[1], imposed April 1, 2015, which directed the State Water Resources Control Board to impose restrictions to achieve a statewide 25% reduction in potable urban water use relative to 2013 levels. San Diego Public Utilities, the City's water supply utility, identified SDHC as one of the City's ten largest water users by total volume and as such, required SDHC to develop a plan for substantial reductions. Irrigation of SDHC's outdoor landscapes, which were comprised almost entirely of conventional turfgrass, hedges and trees, represented 25%-30% of the Commission's water

[1] Executive Department, State of California, Executive Order B-29-15, April 1 2015.

consumption; thus to meet the required reductions, SDHC eliminated all landscape irrigation. While this measure was highly effective at reducing water consumption, previously landscapes predictably withered in the summer of 2015, leading to dusty and brown landscapes and significant tree mortality. By the late summer of 2015, the poor condition and quality of landscapes, and the resulting airborne dust, was the chief source of resident complaints to SDHC.

It was amply clear that transformation of SDHC's entire approach to landscaping and green space was needed. On August 25th, an Action Plan was presented to the SDHC Board of Commissioners that included a three point plan for the future of its landscaping:

(1) "Go Gold" – transform to a low water use landscape palette and aesthetic rather than conventional irrigated turfgrass and shrubs.

(2) Reach out to constituents – engage residents in determining the future of landscapes and common spaces

(3) Identify long-term water-wise conservation strategies – including plant selection, use of alternative water sources for non-potable use, and renovation of outdated irrigation equipment.

Developing an Outreach Program for Landscape Transformation

Initiating Work though a Proposition 1 Grant

In 2016, SDHC sought and received support from a State of California Department of Water Resources Proposition 1 Disadvantaged Communities Planning Grant to begin implementing the three-point Action Plan and to develop new, water-efficient landscape standards for its property portfolio. SDHC committed from the outset to engaging residents, maintenance technicians, and property managers in the re-

design process, and teamed with staff from the Bioregional Center for Sustainability Science, Planning and Design at the University of California San Diego (UCSD) to develop and carry out a multi-faceted community engagement plan. The collaborative project, which began in January 2018 and concluded in June 2020, resulted in new overall landscape standards for all SDHC properties, as well as landscape rehabilitation plans for seven SDHC properties set to undergo renovation in 2020 and 2021. SDHC's new landscape standards include water-efficient irrigation, xeriscape or very-low water use landscape materials, low-impact development (green infrastructure) stormwater management features, and the use of laundry greywater and rainwater harvesting systems. The variety of engagement and bi-directional learning efforts undertaken, including a social mapping exercise with one of SDHC's senior living communities, provided many important and transferable lessons.

Structuring the Outreach Program

In keeping with the Action Plan's emphasis on constituent outreach, SDHC and UCSD worked to structure meaningful engagement in the transformation of SDHC's landscape paradigm. The contract for the design consultant (Simon Landscape Architecture) provided for the project's consulting landscape architect and engineer to be directly involved in the design and implementation of the outreach plan, rather than simply attending meetings or receiving meeting notes. The outreach planning included actions to involve residents, property managers, and maintenance technicians who oversee the day-to-day management of common spaces, landscapes, laundry areas, and parking lots. The ultimate outreach plan was vetted with SDHC leadership, and included site walks, meetings with maintenance technicians and property managers, information included in resident newsletters, a survey of all residents on interest in establishing community gardens at SDHC properties, and multiple resident meetings at

different properties. Through different means, all activities were focused on eliciting residents' desires, experiences and perceptions around the future of their landscapes, including issues of aesthetics, recreational uses, approaches to storm water management, options for rainwater harvesting and laundry greywater systems, and interest in community gardening.

Challenges and Barriers to Outreach

From the outset, engagement was challenged by the absence of a formal institutional structure for resident feedback and involvement, and a history of limited interaction between residents and management. Moreover, provisions within the United States Fair Housing Act that govern all resident communication often have the effect of limiting the impact and benefit of outreach. The Property Management group of SDHC has interpreted Fair Housing Act equal treatment provisions to require information be provided in English only, or else to be translated into all 15 +/- first languages spoken by SDHC residents – an interpretation that limited the reach of project materials and presentations to the many Spanish-speaking resident households. On the whole, the most effective resident engagement came through the community gardening survey, which elicited 143 responses, a 6.6% response rate; and through a series of meetings culminating in a social mapping effort at Belden Village Senior Apartments.

Social Mapping at the Belden Village Senior Apartments Community

Property Overview

A sustained engagement effort was undertaken at Belden Village Senior Apartments, a 243-unit apartment complex located in the Linda Vista neighborhood of the City of San Diego (Figure 1, Location Map). Occupancy at Belden Village is restricted by a City of San Diego Condition Use Permit (CUP) to households that meet

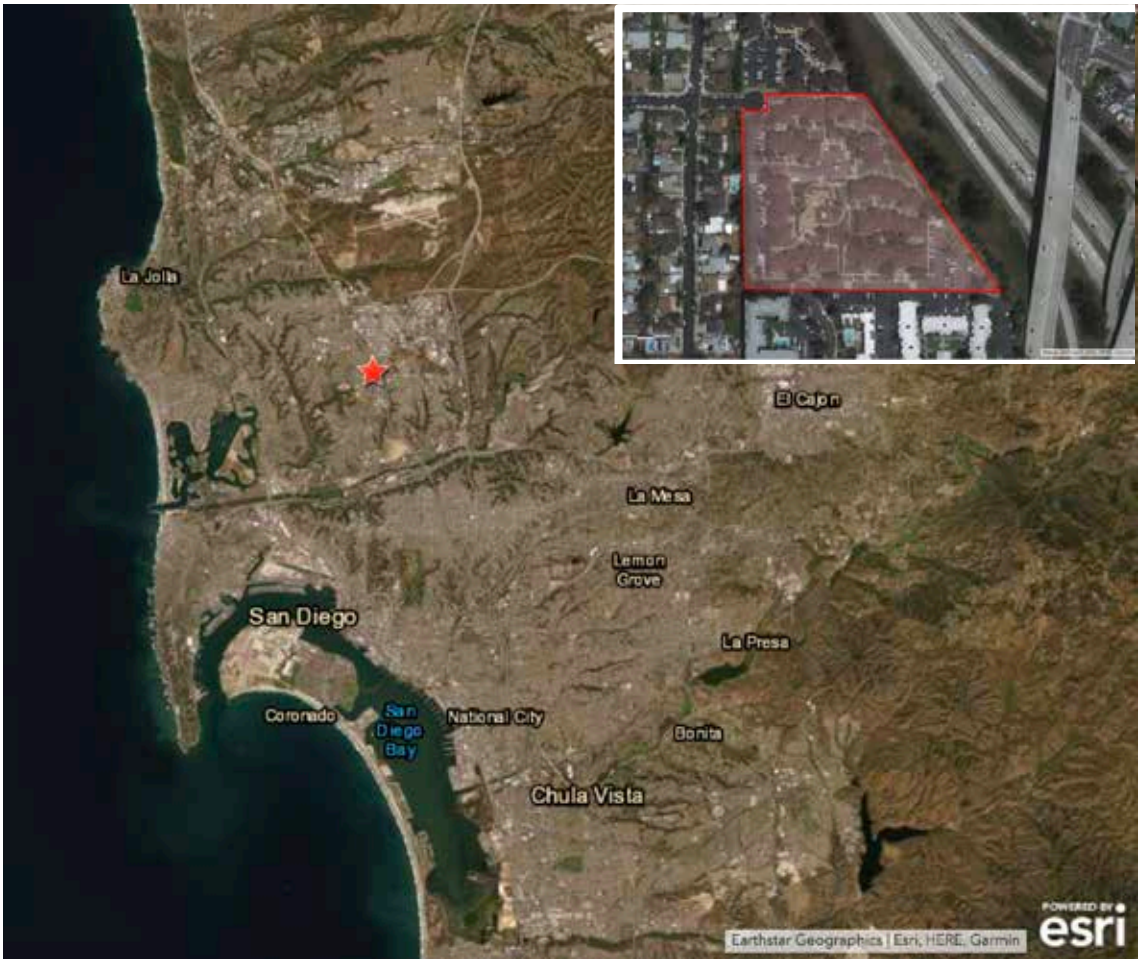

Figure 1. Location Map, Belden Village Senior Apartments, San Diego, CA

age or disability requirements set forth in the CUP. The property comprises roughly 7 acres of land bounded on three sides by residential development, and on the fourth by a steep embankment above Interstate 805. Nine buildings with 16 to 32 units each are arranged around a central common building containing meeting and recreation facilities. Two stand-alone buildings have shared laundry facilities, and there are three primary parking lots. Landscaping of common open areas has consisted primarily of turfgrass lawns, shrubs, and deciduous trees, with unmanaged landscaping along the fence line above the I-805 embankment. As Belden Village is slated for landscape renovation in FY2022, it was chosen as a site for more intensive community engagement around landscape transformation.

Initial Community Outreach

In April 2019, two community meetings on the landscape transformation project were held at Belden Village. While meetings were advertised and open to residents of any SDHC property, the meeting's attendees were chiefly drawn from Belden Village. Residents were asked for input and experience of any and all aspects of the landscape, including parking lots, flooding, common spaces, and conditions since the 2015 drought restrictions were took effect. The presentation provided options and solicited input on possible types of plants and plant palettes compatible with a low water use regime; residents' knowledge of and interest in rainwater harvesting; their knowledge of and interest in laundry greywater systems to irrigate fruit trees, including potential limitations on detergents if greywater systems were implemented; and the potential to establish a community garden for Belden Village, whether in one central location or through individual, distributed plots or beds that would be made available to residents.

Themes from Initial Public Outreach

Discussion at the meeting, and prior focus groups with residents, pointed to several important themes. First, the turfgrass areas around Belden Village were valued strongly for aesthetics ("I love the green"), as well for their importance to dog-owning residents. Residents attending the meetings expressed that they were disheartened by the conditions in 2015 when irrigation was eliminated. Second, there was considerable knowledge of and familiarity with rainwater harvesting systems, a finding consistent with the significant knowledge expressed by SDHC's maintenance technicians in their focus groups, likewise held in the spring of 2019. Third, there was strong interest in establishing a community garden, though opinions diverged on the utility of a central garden versus individual plots available closer to individual units.

Enabling More Specific Design Input

While the input and engagement in the meeting format was valuable, the design team wished to explore residents' preferences for turfgrass and garden sites in more detail as plans were developed. It was clear that some level of turfgrass was desired and important to residents; however, limiting turfgrass to critical areas was equally important to meeting SDHC's water consumption goals. Moreover, only a handful of residents participated in each meeting. In May, roughly one month after the first public engagement meetings and at the beginning of the formal design process, the team decided to develop a social mapping exercise that would provide each resident with an individualized means of participation.

The Social Mapping Process

Using an approach originally developed for the design and siting of neighborhood green infrastructure (Hinds et al. 2005), the UCSD and SDHC team developed a social mapping process for Belden Village. The process was intended to reach and solicit information from all resident households on the specific spatial nature of their preferences for landscape features, including turfgrass, trees, different types of xeriscape landscaping, and resident-planted gardens. Fundamentally, the social mapping exercise gave residents a low-barrier, convenient, and no-cost means of expressing their individual experience and preferences regarding landscaping. The social mapping approach likewise gave the team a means of creating an aggregated map of resident input that could be translated immediately and directly into the landscape design process, making it an effective means of bi-directional learning with tangible impacts on the ultimate site design.

In July 2019, 242 resident households was provided with a map of their unit's immediate environs, a boxed set of five different colored wax crayons, and instructions

(in English) for drawing on the map and returning it to the central mail pick-up location in the community building. Ultimately 34 of the 242 units participated and returned the maps, along with many written comments, a participation rate of 14% versus the 3.5% rate of participation in conventional meetings.

Methods and Materials

Using the University ArcGIS platform, UCSD students prepared and printed thirty-two unique 11" x 17" aerial maps, with each centered on the sub-buildings in the nine complexes on the site. Each unique map (Figure 2) highlighted the roof of the sub-building, indicated the unit numbers contained, and where applicable showed the boundaries of the Belden Village property. On the right side of each map, text, photos and colors corresponding to the provided crayons directed residents to use the crayons to indicate areas of preferred landscaping. Residents were directed to mark an X to indicate areas where they preferred SDHC keep the current landscape condition

In order to meet SDHC Property Management's interpretation of Fair Housing Act guidelines, identical sets of maps, instructions and crayons were placed on the door handle at each of the 242 units (Figure 3). SDHC residents were informed through a letter sent to each household providing an overview of the mapping exercise and of the planned presence of UCSD students and staff on campus distributing the maps. Residents were instructed to return completed maps to a drop-off box at the window of the property management office, in the same area where mail is picked up. Remarkably, no complaints or objections were reported regarding the delivery of the maps. Nine residents provided extensive written comments in addition to completing and returning the mapping exercise.

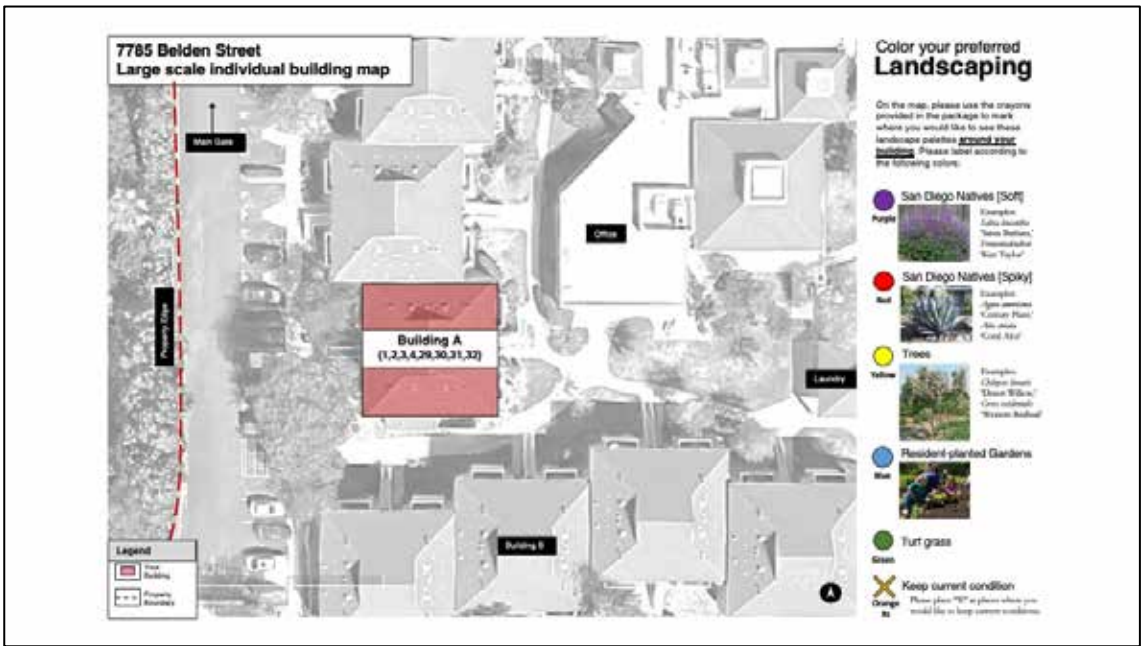

Figure 2. Example of Large Scale Individual Building Map Provided to Residents

Figure 3. Photo of Maps and Crayons Delivered to Individual Residential Units

Project Costs

The total materials cost of the project was under $200, including printing of the maps and instructions, and 242 boxed sets of five colored crayons. No postage was necessary as completed social maps were dropped in a box in the central office at Belden Village. Two UCSD undergraduate students prepared the individual maps, compile and deliver the instructions, maps and crayons to each unit, and develop the consolidated maps into PDFs for presentation. Their combined effort totalled roughly eighty hours for all activities. SDHC and UCSD staff oversight was relatively minimal; SDHC's staff were responsible to ensure coordination with the property management office at Belden Village as well as SDHC's communications department.

Resident Response

A total of 34 maps were returned, including at least two maps from each of the nine buildings. The maximum number of returned, completed maps was 9 from Building B, with a median and mode of 5 maps returned per building. For each of the nine buildings, UCSD students prepared a composite map using Adobe Illustrator showing where and what type of landscapes respondents had indicated on their individual maps (Figures 4 through 12). Where residents of the same building gave different responses for the same landscape area, the composite maps showed overlapping colors and X marks, making areas of consensus and disagreement relatively easy to spot. Finally, a composite map for the entire property was prepared (Figure 13). The composite was provided to the design team and then presented at a second set of resident meetings at Belden Village in late August, 2019.

Figure 4. Map by Building A7785 Residents

Figure 5. Map by Building I7713 Residents

Figure 6. Map by Building H7705 Residents

Figure 7. Map by Building G7727 Residents

Figure 8. Map by Building F7737 Residents

Figure 9. Map by Building D7753 Residents

Figure 10. Map by Building C7761 Residents

Figure 11. Map by Building B7795 Residents

Figure 12. Map by Building A7785 Residents

Figure 13. Composite Social Map of Belden Village

Findings on the Composite Social Map

The composite social map clearly showed areas where turf grass continued to be desired to the responding residents, notably along the most commonly-used walking paths and adjacent to the common laundry building at the north end of the property. The composite map also showed, quite clearly, that responding residents saw value in a "spiky" (i.e. succulent- or cactus-heavy) xeriscape palette along the embankment above I-80t and two property borders (northeast and southwest) where trespassing and homeless encampments have been a chronic challenge. Responding residents also consistently colored in a "soft" (i.e. salvias and other leafy low-water use plants) xeriscape palette in many areas of the property. Many respondents noted locations for additional tree planting, along with numerous "retain current landscape" marks in areas where tree and turf cover remained in relatively good condition through the 2015 drought.

Of particular note were the relatively few responses indicating locations where community or individual resident gardens were desired. Respondents differed on the

utility of re-establishing a community garden at the northwest end of the property where trespassing has occurred, and a strong preference for individual gardens was indicated by a handful of respondents in one set of buildings at the north end. Overall, there was less enthusiasm expressed for individual or community gardening at Belden Village than among SDHC residents of other properties, whose responses to a May-June 2019 survey on community garden opportunities indicated strong and widespread interest.

The building-level and overall composite maps, along with the overall landscape and storm water management concepts for the property, were presented to Belden Village residents at two follow up community meetings held in August 2019. While no specific survey instruments or other post-engagement measures were administered, participants generally indicated that the social mapping experience was a positive one, and that the proposed landscape techniques – including implementing efficient subsurface irrigation of renovated turf areas – was acceptable and responsive.

Translation of Social Mapping to Site Design

On the whole, the direction provided through the composite social map was readily translated to landscape renovation and storm water management planning for the site. First, through resident engagement and the social mapping exercise, the design team gained specific insights into areas where conventional landscape had thrived and where change was not only possible, but acceptable (or even desirable) to residents. Working from this base of knowledge and resident direction, the design team used Belden Village to illustrate where and how specific types of storm water management, landscape irrigation, plant palette, and non-potable water supplies would be applied in SDHC's final *Typical BMP Landscape Solutions* document (https://bioregionalcenter.ucsd.edu/_files/BMP-Typicals-San-Diego-Housing-Commission-Document-1.pdf). Each of the indicated BMPs are illustrated in locations,

and involve plant palettes or irrigation techniques, that are consistent with the resident-generated social map. As an example, the specification for LP11 of subsurface irrigation would support continued maintenance of the turfgrass in this area, which was mapped by most respondents as the preferred condition (Figure 14). Similarly, terracing with "soft" xeriscape could be implemented readily on the walkway outside the community building (LP4).

Conclusions and Lessons Learned

Of the engagement techniques used in the SDHC landscape transformation planning process, the community garden survey and the social mapping exercise at Belden Village elicited the highest response rates among those contacted. The team provided information targeted to each resident's immediate built environment, provided all supplies needed to complete the exercise, and had the maps dropped off without cost at the most frequently visited and central site on the property. This ensured that limitations related to physical disability or financial cost were minimized, though participation did rely on some English language reading and comprehension skills to understand the instructions.

It is worth noting that the social mapping exercise also did not elicit any negative comments, either in writing or emails to SDHC Property Management or to the property manager on site at Belden Village. Given the relative dearth of prior resident communication and engagement by SDHC management, particularly around landscape issues, the fact that responses to the social mapping exercise focused on landscape issues and options rather than being used as an opportunity for general complaints was a positive outcome. Residents also responded positively to the involvement of University students, who gained valuable outreach and planning experience in the process.

Figure 14. Poster Developed for Communication of Landscape Types

On the whole, the social mapping project offered a positive and direct means of understanding residents' experience and perceptions of landscape conditions, and providing directly useful input into a landscape design process. The low cost of the project (under $2,000 in labor and materials), positive resident response, minimal barriers to participation, and bi-directional learning opportunities made this exercise an excellent complement to the conventional process of uni-directional presentations, or conventional design charrettes. An advantage offered is the opportunity for residents to consider and process input on their own time, rather than having one opportunity to attend a meeting or lose the ability to participate in design. Ideally, instructions would have been provided in Spanish and other first languages of residents. Nonetheless, the experience offers a valuable template for a meaningful and positive means of learning from residents as landscapes and water use are transformed for a more sustainable future.

Acknowledgements

The authors acknowledge the financial support for this project provided through a State of California Department of Water Resources Proposition 1 Disadvantaged Communities Planning Grant administered by the San Diego County Water Authority.

References

Hanak, Ellen, Jeffrey Mount, Caitrin Chappelle, Jay Lund, Josué Medellín-Azuara, Peter Moyle, & Nathaniel Seavy. August 2015. What if California's Drought Continues? Public Policy Institute of California. https://www.ppic.org/content/pubs/report/R_815EHR.pdf

Heyen, N., Perkins, H.A., & Roy, P., (2006). The Political Ecology of Uneven Urban Green Space: The Impact of Political Economy on Race and Ethnicity in Producing Environmental Inequality in Milwaukee. Urban Affairs Review, 3-25

Hinds, J.B., Alexey Voinov & Patricia Heffernan (2005). Adapting and Scaling Social Marketing Techniques to Regional, Municipal and Neighborhood Stormwater Objectives: A Case Study from South Burlington and Chittenden County, Vermont. Proceedings of the 4th National Conference on Nonpoint Source and Stormwater Pollution Education Programs. October 17-20, 2005, pp. 150-158.

National Academies of Sciences, Engineering, and Medicine (2011). Public Participation Strategies for Transit. Washington, DC: The National Academies Press. https://doi.org/10.17226/22865.

Redko, Cristina & Bessong, Pascal & Burt, David & Luna, Max & Maling, Samuel & Moore, Christopher & Faustin, Ntirenganya & Martin, Allison & Petroze, Robin & Hartog, Julia & Ballard, April & Dillingham, Rebecca. (2016). Exploring the Significance of Bidirectional Learning for Global Health Education. Annals of Global Health. 82. 10.1016/j.aogh.2016.11.008.

Soundappan, Kathirvel & Kathiresan, Jeyashree & Patro, Binod. (2012). Social mapping: A potential teaching tool in public health. Medical teacher. 34. e529-31. 10.3109/0142159X.2012.670321.