

Coding Guide and Visual Demonstration of Google Gentrification Observation in Chicago^{1,2}

Example block face 1

Address: 815 North Cambridge Avenue



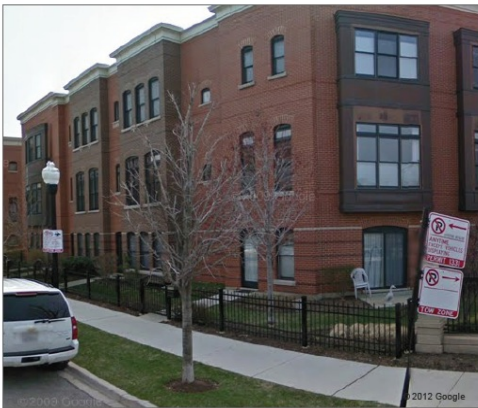
Example block face 2

Address: 524 North Bishop Street



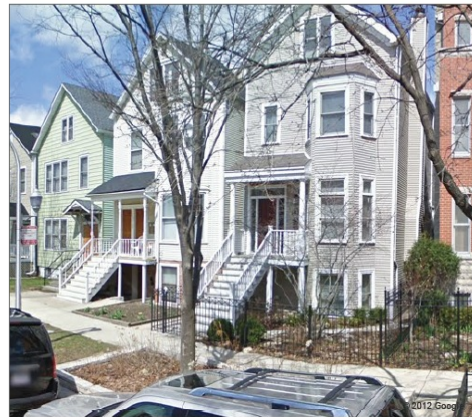
Example block face 3

Address: 1445 South Peoria Street



Example block face 4

Address: 1318 West Melrose Street



To interactively explore Google Street View (using the classic version of Google Maps) with the example block faces:

1. Enter <https://maps.google.com/> in your web browser.
2. Type the street address listed for each example in the map search bar at the top of the screen and press “enter.” The map will center to the address you entered.
3. Drag the “pegman” (the orange figure below the compass and above the zoom bar on the upper-left-hand side of the map) to one end of the block face. This will bring your screen to the Google Street View application.

¹ Using Google Street View to observe gentrification is part of an ongoing project. Updated instrument and coding guide are available at: <http://scholar.harvard.edu/jackelynhwang/projects/ggo>.

² The detailed characteristics for each indicator of the instrument described are specific to Chicago, although the GGO instrument was also tested in Boston, MA and Philadelphia, PA with similar results overall. However, due to variation between cities in building stock, public infrastructure styles, and land markets, we recommend that the specific characteristics used to identify each indicator be adjusted accordingly.

4. To move forward and back along the street, use the up and down arrow keys on your keyboard or click along the street with your mouse. To get panoramic views, use the right and left arrow keys on your keyboard or drag on the screen with your mouse. To zoom in and out, use the scroll button on your mouse, click off the street with your mouse, or click on the “+” and “—” buttons below the compass in the upper left-hand side of the Google Street View screen.
5. Because block faces are only a single side of the street, only code the side of the street in the relevant census block unit.

Example Block Face 1: 803–869 N. Cambridge Avenue, Chicago, IL 60610 (East block face)

Block-face stage score: .41; Tract stage score: .47

L1. 1	N3. 0	B2. 0	D3. 0
P1. 0	N4. 0	B3. 1	G1. 2007/2009
N1. 0%	N5. 0	D1. 0	G2a. 1
N2. 1	B1. 1	D2. 1	G2b. No diff. bt yr

Example Block Face 2: 508–579 N. Bishop Street, Chicago, IL 60642 (East block face)

Block-face stage score: .58; Tract stage score: .60

L1. 1	N3. 0	B2. 1	D3. 1
P1. 0	N4. 0	B3. 1	G1. 2009
N1. >50%	N5. 0	D1. 0	G2a. 0
N2. 1	B1. 0	D2. 1	G2b. n/a

Example Block Face 3: 1445–1519 S. Peoria Street, Chicago IL 60608 (West block face)

Block-face stage score: .88; Tract stage score: .75

L1. 0	N3. 1	B2. 1	D3. 1
P1. 0	N4. 1	B3. 1	G1. 2009
N1. >50%	N5. 0	D1. 1	G2a. 0
N2. 1	B1. 0	D2. 1	G2b. n/a

Example Block Face 4: 1300–1386 W. Melrose Street, Chicago, IL 60657 (North block face)

Block-face stage score: .94; Tract stage score: .81

L1. 1	G2a. 0
P1. 1	G2b. n/a
N1. 11-50%	
N2. 1	
N3. 0	
N4. 0	
N5. 1	
B1. 0	
B2. 1	
B3. 1	
D1. 1	
D2. 1	
D3. 1	
G1. 2009	

Detailed Description for Each GGO Instrument Item³

L1. Primary land use (residential, commercial, institutional, mixed [residential/ commercial/ institutional], industrial, other [e.g., highway])

This code categorizes the primary land use for a block face and includes the intended use of areas set for construction or under construction if distinguishable (e.g., based on signage).

“Residential land use” consists of structures that appear to be used as single- or multi-family dwellings, including public or subsidized housing. “Commercial land use” consists of structures that appear to be used as office or retail space. “Institutional land use” consists of structures that appear to be used primarily as schools (including nonresidential university buildings), religious institutions, and medical facilities. A block face is coded as “mixed-use” if more than one of the first three listed land uses is present for at least one-third of the structures of the block face, including areas set for or under construction with the intended land use distinguishable.

“Industrial land use” consists of structures that appear to be used for manufacturing, assembly, and warehouse. “Other” consists of any land uses not included above (e.g., highways, subway and railway tracks, parking lots and garages, stadiums, recreational parks and fields, brownfields, undeveloped vacant lots, miscellaneous green space between highways, and rail tracks). We also coded land uses as “other” if there was no Google Street View access to the block face and land use was indistinguishable. **We only observed and coded residential, commercial, and mixed land use block faces for the remaining instrument items.**

For the following two instrument items, coders first categorized structures from the exterior as older structures versus new construction or renovation. We used the following characteristics as guides for determining if a structure was “new”:

- modern design: sleek, geometric, glass or steel exterior materials, lack of ornate detailing around window frames and façade, lack of aluminum siding
- sandblasted brick: unstained and bright
- reconstructed or restored porches and balconies, window frames, and doors: fresh paint, well-kept and attractive, modern design
- new signage (e.g., house numbering)

For large-scale multi-family dwellings (100+ units), we used the following characteristics to determine if a structure was “new”:

- modern design: sleek, geometric, glass or steel exterior materials, large windows, rectangular, no concrete
- new balconies: fresh paint, well-kept and attractive, modern design
- new signage (e.g., building name), entryways, and walkways: no cracks in pavement, fresh paint, modern design

For commercial units, we used the following characteristics to determine if a structure was “new”:

- modern design: sleek, geometric, glass or steel exterior materials, lack of ornate detailing around window frames and façade, lack of aluminum siding
- sandblasted brick: unstained and bright

³ We only coded parcels on the block face and ignored structures and indicators that were visible from the observed block face but were part of parcels on adjacent block faces.

- reconstructed or restored window frames and doors: fresh paint, well-kept and attractive, modern design
- new signage

Because commercial uses can change frequently and undergo renovation with each change, buildings with mixed uses may have “new” (rehabbed) commercial structures with older residential units.

For all land uses, at least two characteristics should be present to be considered as “new.” In addition, structures must not have peeling of faded paint, obvious necessary structural repairs, or deteriorated or discolored siding or brick. If buildings are undergoing construction or major rehabilitation at the time of observation, we considered these as “new.”

These characteristics are consistent with accounts of gentrification as a process of preservation and restoration of older homes and converted-use warehouses, as well as new-build gentrification of modern home construction and condominiums. Because our working definition of gentrification entails reinvestment and renewal, we consider any new construction, both modest and luxury quality, as reinvestment in a neighborhood. We categorize structures that do not fit this description as older.

P1. For land uses that are not new, most or all appear to be in good condition (well-kept, attractive, and sizeable)

The purpose of this indicator is to determine the preexisting structural condition of the block face, particularly if structures on the block face have been in good condition for an extended period of time. For this instrument item (P_1), we coded block faces as 1 if at least 75% of the homes categorized as older are “well-kept, attractive, and sizeable.” We used the following characteristics to determine if a structure was “well-kept, attractive, and sizeable”:

- absence of peeling or faded paint, no obvious structural repairs needed, and no deteriorated or discolored siding or brick
- porches and balconies, windows and frames, doors, signage (e.g., house numbering, business signage), entryways, storefronts, and walkways beyond basic design or décor
- large enough to comfortably house at least a family of two adults with children

Because it is sometimes difficult to distinguish between new construction/rehabilitation and older homes that are well-kept, attractive, and sizeable, we combine the scores for the condition of older homes (P_1) with the degree of new structures (N_1 , N_2 , N_3 , N_4 , and N_5) to form a “structural mix” score for determining the neighborhood stage score, as described in the main text. A block face categorized as having most of its older homes in well-kept, attractive, and sizeable condition would receive the same structural mix score as a block face with all of its homes, both new and old, in well-kept, attractive, and sizeable condition, even if the coder only categorized a fraction of the homes as older. In addition, the block face would receive a similar structural mix score if we categorized all of the structures as newly constructed or rehabilitated.

We coded each example block face for the P_1 indicator as follows:

- Ex. 1: We coded this block face with a 0. We categorized all of the structures as older with a lack of modern design, no sandblasted brick, no new signage or walkways, and the presence of deteriorated brick. Furthermore, the deteriorated brick and basic design of

windows and frames, doors, and entryways, as well as the small size of units based on the spacing between exterior doors indicate these are not all well-kept, attractive, and sizeable units.

- Ex. 2: We coded this block face with a 0. We categorized most of the structures as newer except for one tan house, due to its lack of modern design and sandblasted brick. This structure is well-kept and has some features that are beyond basic design or décor (e.g., window frames and entryway), but it appears to be a split-level home and is of modest size. One could arguably consider this home to be rehabbed within the past 10 to 15 years—with its newer entryway and window frames—and if this was the case, the block would still receive the same structural mix score. While relatively modest in design (rather than luxury), we categorized the townhomes in the image as newly constructed. Another apartment building on the street is difficult to distinguish between older and newer, but based on its sandblasted brick and the absence of peeling paint, no obvious structural repairs needed, and no deteriorated siding or brick, we categorized the building as having been constructed or rehabilitated within the past 10 to 15 years. Based on the one structure categorized as older, we therefore coded the block face with a 0.
- Ex. 3: We coded this block face with a 0. We categorized all the structures as new based on the modern design, sandblasted brick, new entryways and walkways, absence of peeling paint, no obvious structural repairs needed, and no deteriorated siding or brick.
- Ex. 4: We coded this block face with a 1. We categorized a majority of the structures as older except for four houses with modern design and sandblasted brick. The homes we categorized as older were nearly all well-kept, attractive, and sizeable, with no peeling paint, no obvious structural repairs needed, and no deteriorating siding or brick; porches and balconies, windows and frames, doors, entryways, and walkways were beyond basic design or décor; and they were large enough to comfortably house a family. Only one home was modestly sized and lacked features beyond basic design or décor.

N1. Amount of new land uses (rehabilitation or new construction appearing to be completed within approximately the past 10 to 15 years) (0%, 1–10%, 11–50%, >50%)

See earlier description for how residential and commercial structures were categorized as new. We estimated percentages out of the amount of the block face occupied by buildings on the block face, including areas set for construction or under construction but excluding vacant areas. For Ex. 1, we coded 0% as new, >50% for Ex. 2, >50% for Ex. 3, and 11–50% for Ex. 4.

N2. New signs or structures controlling traffic (e.g., speed, pedestrian crossing, bike lanes, parking)

This indicator captures aspects of public reinvestment. Traffic signs and structures include speed limitation signs or speed bumps, pedestrian crosswalks and signs, bike lanes, parking limitation signs (e.g., handicap parking, no parking times), and any other public signs controlling traffic. “New” refers to signs and structures that appear to have been installed within approximately the past 10 to 15 years, presumably by the city. Bright and unfaded paint or print indicates new signs; speed bumps or crosswalks in the road without cracks or obvious repairs needed and bright and unfaded paint on the road (if applicable) indicate new traffic structures. We consider vandalism as a separate indicator that does not affect how we code the age of traffic signs and structures. All example block faces contained signs limiting traffic or parking with bright and unfaded paint or print and were thus all coded with a 1.

N3. New public courtesies (e.g., bus stop or subway entrance, street furniture, bike racks, public trash cans, street lamps)

This indicator captures aspects of public reinvestment in public space. Public courtesies include bus stops or subway entrances, public seating, bike racks, public trash cans, newspaper stands, mailing depositories, and street lamps. “New” refers to signs and structures that appear to have been installed or rehabilitated within approximately the past 10 to 15 years, presumably by the city. Bright and unfaded paint without obvious repairs needed and modern design or décor (for bus stops, subway entrances, public trash cans, and street lamps) indicate new public courtesies. We consider vandalism as a separate indicator that does not affect how we code the age of public courtesies. Modern bus stops and modern public trash cans in Chicago appear as in Figs. 1 and 2 below. We did not find any new subway entrances = in the observed sample. Only Ex. 3 contains public courtesies—street lamps—that appeared new based on their bright and unfaded paint and modern design and décor.

Fig. 1. Modern bus stop in Chicago
Address: 1809 West Polk Street



Fig. 2. Modern public trash can in Chicago
Address: 2986 North Sheridan Road



N4. New large-scale development (e.g., luxury condos, large residential/commercial area developments, converted industrial use)

This indicator captures aspects of large-scale reinvestment. We coded block faces with a 1 if they contain new structures that are also luxury high-rise condominiums, large residential/commercial area developments occupying at least the entire block face, or converted industrial use to residential or commercial use. If the development consists of single-family dwellings or are low-rise, we only considered these as “large-scale” if they occupied at least 75% of the block face. Warehouse buildings being used for residential or commercial purposes based on the signage, entryways, and walkways indicate converted industrial land use (see Fig. 3). See earlier description for “new” building structures. If all structures were considered “old,” the block face received a 0 for this indicator. Signage, entryways, and walkways beyond basic design or décor indicate new luxury condos (see Fig. 4). Homogeneous architectural design with signage, entryways, and walkways beyond basic design or décor and that occupy at least the predominant land use of the block face indicate new large residential and commercial developments. We also included areas under construction in which signage indicated this land use. Only Ex. 3 has a new large residential development, which occupies the entire block face.

N5. Residential or commercial units for sale or lease in new condition or under construction

This indicator captures aspects of recent reinvestment by outside investors or developers, that is, not by residents themselves. We coded block faces with a 1 if they contain new structures that are also for sale or lease (not rent) based on signage (e.g., Fig. 4). See description for “new” building structures from item P1. If all structures were considered “old,” the block face received a 0 for this indicator. We also included areas under current construction that were for sale, as indicated by signage. Only Ex. 4 contains a residential unit in new condition for sale.

Fig. 3. Converted industrial use
Address: 1962 South Halsted Street

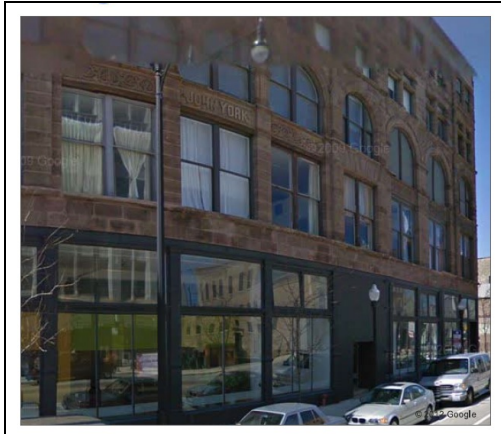
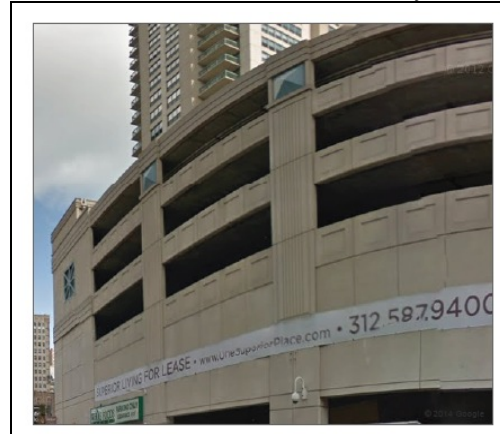


Fig. 4. Luxury high-rise condominiums
Address: 705 North Dearborn Parkway



B1. Sign discouraging disorder (e.g., neighborhood watch, anti-littering/ loitering/ drug use/ vandalism/ graffiti [including if painted over or mural art])

This indicator captures reinvestment in the aesthetics of a neighborhood that go beyond physical building structures through signs of efficacy to counter disorder. This includes street signs explicitly discouraging crime and disorder (e.g., neighborhood watch, littering, loitering, drug use, vandalism, and graffiti), security cameras, and painting over graffiti, mural or sculptural art, and community markers (e.g., structures or sculptures that signify a community). This indicator does not include banners and signs on lamp posts or signs controlling traffic and parking. Paint over graffiti is often evident due to inconsistent paintbrush strokes and coloring. Ex. 1 had painted-over graffiti.

B2. Beautification in personal frontage

This indicator captures reinvestment in the aesthetics of a neighborhood that go beyond physical building structures through signs of efficacy to beautify the visible frontage of private space that is separate from the basic painting and upkeep of the building structure and façade. This includes evidence of well-kept landscaping or gardening work, patio or yard furniture, and planters and accessories beyond basic grass maintenance. For one-to-four-family residential structures, this includes modest landscaping (e.g., planted shrubs). For multi-family residential structures, we considered beautification present if there was landscaping or gardening work that was intentionally decorative, that is, beyond basic grass maintenance and planted trees and shrubs with no distinguishable design. We did not include fencing for this indicator. For commercial structures, this includes decorative signage and frontage beyond basic design or décor and with no signs of deteriorated condition or repairs needed. Ex. 2, 3, and 4 show residential landscaping or gardening work.

B3. Vacant area and public street frontage beautification, upkeep, fencing, or set for construction

This indicator captures reinvestment in the aesthetics of a neighborhood that go beyond physical building structures, through signs of efficacy to beautify visible public space (e.g., vacant lot areas and frontage areas from sidewalks to the street). This includes evidence of landscaping or gardening work, yard furniture, and planters and accessories in public space and improvement of

vacant spaces, including fencing, grounds maintenance, or indication of future construction. This indicator includes basic grass maintenance but does not include planted trees without additional planters or accessories. Vacant areas are only considered if they stand alone from other residences and structures and do not appear to be established park or recreational areas. Vacant areas need only show any sign of maintenance and may also have other visible signs of disorder. The kempt grass in the vacant lot from Ex. 1, the fencing around the vacant lot in Ex. 2, the landscaped grass and trees between the sidewalk and streets in Ex. 3, and the planters in the areas between the sidewalk and streets in Ex. 4 are all indicators of public space beautification.

D1. Residential block faces lacking physical disorder (garbage, litter, graffiti, and vandalism)

This indicator captures if there are no visible aspects of physical disorder that discourage reinvestment in a neighborhood, beyond physical building structures, through signs that show a lack of efficacy to counter visible physical disorder. This includes evidence of light garbage, litter, or broken glass on the street or sidewalk; graffiti (not painted over) on buildings, signs, or walls; and vandalism of any signs, public courtesies, or objects in private or public frontage (e.g., yard furniture or planters). For garbage, litter, and broken glass, we coded this indicator as present if the block face received a score lower than 2 (light) on a scale ranging from 0 (none) to 6 (very heavy) that measured the amount of garbage, litter, and broken glass present. This rule is intended to eliminate uncertainty with small pieces of garbage, litter, and broken glass that are sometimes hard to distinguish due to the resolution of the images. We coded Ex. 1 with a 0 for this indicator due to the litter and garbage in the vacant lot, and we coded Ex. 2 with a 0 due to the graffiti on the “for sale” sign in the vacant lot. We did not code this indicator for commercial or mixed-use blocks due to the overwhelming presence of litter and garbage in commercial areas.

D2. Lacking unkempt vacant areas and public street frontage

This indicator captures if there are no visible aspects of physical disorder that discourage reinvestment in the neighborhood, beyond physical building structures, through signs that show a lack of efficacy to counter visible physical disorder in public spaces (e.g., vacant lot areas, frontage areas from sidewalks to the street). This includes overgrown grass and weeds. Vacant areas are only considered if they stand alone from other residences and structures and do not appear to be established park or recreational areas. Vacant lots can simultaneously be unkempt as well as exhibit signs of beautification for item O3 in the instrument. We coded all examples with a 1 for this indicator.

D3. Lack of structures that appear to be burned out, boarded up, abandoned, or in poor/badly deteriorated condition

This indicator captures if there are no visible aspects of physical decay of the building structures. This includes evidence of a severe lack of maintenance and upkeep of any properties, indicated by windows or doorways boarded up or burned out, serious structural repairs needed, large amounts of peeled paint, or badly deteriorated siding. We included the appearance of any boarded up windows or doors as a sign of this indicator. Ex. 1 was coded with a 0 for this item, because all the windows of the property were boarded up. This indicator only includes vacant residential or commercial properties if they meet the structural characteristics outlined above.

G1. Google Street View image year

This is the year an image was taken and can be found in the lower-left corner of the image. Note that the month of observation was not available during this wave of Google Street View images.

G2a. Street View inconsistency

We coded block faces with a 1 for this item if there were any inconsistencies with the Google Street View images. We found the following inconsistencies during the coding process: images from different years were present for different segments of the same block face,⁴ images were too blurry (e.g., a few images were taken at night), and images only covered a portion of the block or none at all.⁵

G2b. Inconsistency type (no difference between years, decline between years, improved between years, blurry image, limited Street View access, no Street View access)

For block faces that we coded with a 1 for item G2a, the type of inconsistency was recorded. For items with images from different years in different segments of the same block face, we coded block faces based on visible improvements (evidence of reinvestment based on the instrument items), decline (evidence of disinvestment and disorder based on the instrument), or no change.

The GGO Instrument was developed partly based on the following systematic field efforts:

Community Strengths Longitudinal Neighborhood Study (C-STRENGTHS): Systematic Social Observation Using Google Street View. Odgers, Candace L., Christopher J. Bates, Avshalom Caspi, Robert J. Sampson, and Terrie E. Moffitt. 2009. "Systematic Social Observation Inventory: Tally of Observations in Urban Regions (SSO i-Tour)." Irvine, CA: Adaptlab Publications.

Project on Human Development in Chicago Neighborhoods (PHDCN): Systematic Social Observation. Sampson, Robert J. and Stephen Raudenbush. 1999. "Systematic Social Observation of Public Spaces: A New Look at Disorder in Urban Neighborhoods." *American Journal of Sociology* 105(3):603–651. Access to instruments and documentation is provided online at: <http://www.icpsr.umich.edu/PHDCN/>.

Block Environment Inventory. Perkins, Douglas D., John W. Meeks, and Ralph B. Taylor. 1992. "The Physical Environment of Street Blocks and Resident Perceptions of Crime and Disorder: Implications for Theory and Measurement." *Journal of Environmental Psychology* 12:21–34.

Analytic Audit Tool and Checklist Audit Tool. Hoehner, Christine M., Laura K. Brennan Ramirez, Michael B. Elliot, Susan L. Handy, and Ross C. Brownson. 2005. "Perceived

⁴ If there were images from different years and changes in the streetscape between years, we coded instrument items based on the most recent image year.

⁵ We coded block faces with limited access when block segments were short in length and could easily be observed from adjacent streets.

and Objective Environmental Measures of Physical Activity among Urban Adults.”
American Journal of Preventive Medicine 28(2S2):105–116.

Irvine Minnesota Inventory for Observation of Physical Environment Features Linked to Physical Activity. Day, Kristen, Marlon Boarnet, and Mariela Alfonzo. 2005. Codebook accessed at: <https://webfiles.uci.edu/kday/public/index.html>.

Note on Inter-rater Reliability

We conducted inter-rater reliability tests on a set of 103 block faces that we randomly selected from the coded data. This set of block faces spanned 78 census tracts in the dataset. We hired a graduate student research assistant and trained the research assistant with three weekly one-hour in-person training sessions; we used this coding guide, e-mail correspondence, and a training set of 20 randomly selected block faces from the data. The rater completed training when inter-rater reliability was established within the training set. Because Google Street View recently updated their Chicago images to 2009 through 2012, the coder who performed the original coding recoded the set of 103 block faces to allow for comparison between the same images. Trained raters reported that identifying and coding each block face took approximately one to two minutes.

The two blinded raters had an average agreement rate of 83 percent and average kappa score of .50 across 12 instrument indicators, and Pearson and intraclass correlations of .68 and .68, respectively, for the final stage scores. Agreement was lowest—60 and 68 percent, respectively—for the amount of new land uses (N_l) and physical disorder (D_l) indicators. Distinguishing between new and old structures and noticing all of the disorder present on the block face were the most inconsistent between raters. Litter was sometimes difficult to identify due to image resolution, and raters could overlook graffiti and vandalism if they did not use the full panoramic view at each location on the block face.