CITY OF WHEATON

SIDEWALK MAINTENANCE POLICY

INSPECTION CRITERIA

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The following describes what physical conditions determine the replacement of sidewalk squares in the City of Wheaton.

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(1) Castings

Description

Castings are cast iron manholes, valve covers, or other similar devices that may be located within a sidewalk slab. Castings can be a tripping hazard and can interfere with the operation of wheelchairs. Castings are often attached to structures with deep foundations that resist movements caused by changes in moisture or freezing and thawing differently than sidewalks without castings. This difference can cause faulting at the edges of the slab containing a casting and is the basis for the recommendation that slabs containing castings be isolated from adjoining slabs. Castings should be located outside the minimum 4 foot access route in a sidewalk.

Severity Levels

There are no severity levels for castings.

How to Count

Measure each slab that has one or more castings. If a wide slab has a casting, but still retains a minimum of four feet of clear access do not count the distress. Downtown areas have sidewalks that may be ten or more feet wide. These areas will typically have a four foot access route that is free from castings. **Count castings in addition to other distresses for each slab that contains castings.** Record the length of affected slabs in feet.

Figure 1 – Casting

(2) Durability ("D") Cracking

Description

"D" Cracking is caused by freeze-thaw expansion of the large aggregate which, over time, gradually breaks down the concrete. This distress usually appears as a pattern of cracks running parallel and close to a joint or linear crack. Since the concrete becomes saturated near joints and cracks, a dark-colored deposit can usually be found around fine "D" cracks. This type of distress may eventually lead to disintegration of the entire slab.

Severity Levels

M One of the following conditions exists (Figure 2M): (1) "D" cracks cover less than 25 percent of the area and most of the pieces are loose and or missing; or (2) "D" cracks cover more than 25 percent of the area. Most of the cracks are tight, but a few pieces may be loose or missing.

H "D" cracks cover more than 25 percent of the area and most of the pieces have come out or could be removed easily (Figure 2H)

How to Count

When the distress is located and rated at one severity, it is counted as one slab. If more than one severity level exists, the slab is counted as having the higher severity distress. For example, if low and medium "D" cracking is on the same slab, the slab, the slab is counted as medium-severity "D" cracking only. **"D" cracking should be counted in addition to other distresses for a slab with the exception of surface defects.** Record the length of affected slabs in feet.

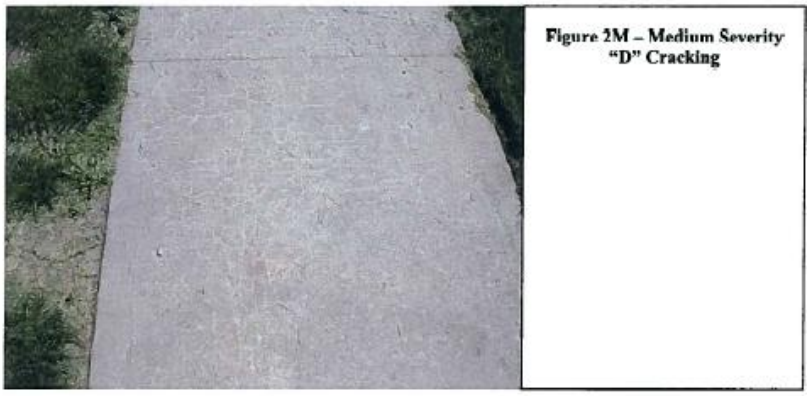

Figure 2M – Medium Severity "D" Cracking

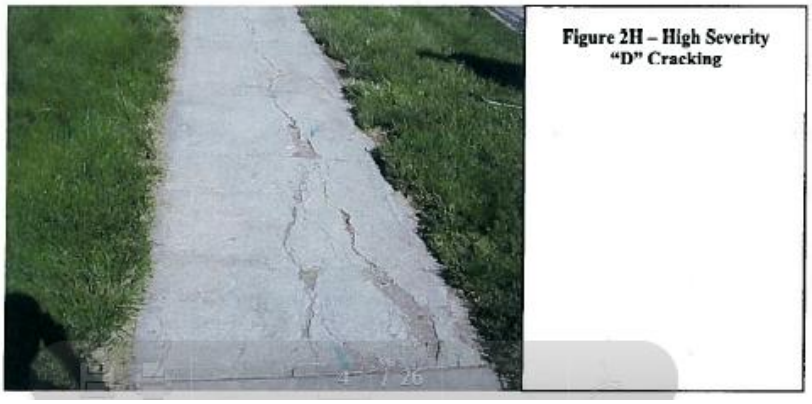

Figure 2H – High Severity "D" Cracking

(3) Faulting (Kickers)

Description

Faulting is the difference in elevation across a joint. Some common causes of faulting are:

1. Settlement because of soft foundation
2. Tree roots that raise a slab above the adjacent slab
3. Overlays on drives

Severity Levels

Severity levels are defined by the difference in elevation across the joint as indicated in Table 3. Figures 3L through 3P show examples of the different severity levels.

Table 3 Levels of Severity for Faulting

Severity Level	L	M	H	P
Difference in Elevation	>1/2" and <1"	1" and <1 ½"	1 ½" and greater	Any difference if patched and the patch is in good condition.

How to Count

Faulting across a joint is counted as one slab. Only affected slabs are counted. If the patch has failed or is not in good condition record the distress as either a Medium or High severity distress (if the difference is less than 1" record a Medium severity distress). Faults across a crack are not counted as a faulting distress, but are considered when defining crack severity. Record the total length of affected slabs in feet. **Faulting should be counted in addition to other slab defect s, except gaps.**

Figure 3L – Faulting ½-1"

Figure 3M – Faulting 1-2"

Figure 3H – Faulting >2"

Figure 3P – Patched Fault

(4) Gap

Description

Gaps are horizontal openings between adjacent slabs caused by settlements, or by differential movements of sidewalk elements. ADAAG guidelines limit these gaps to ½ inch.

Severity Levels

L Gap is visible and <= 1inch

H greater than 1 inch

P Any gap if patched and the patch is in good condition

How to Measure

If two adjacent slabs have a visible gap, record one slab of gap at the appropriate severity level. Do not record cracks as gaps, instead record the measured longitudinal crack. Adjacent slabs will normally have some space between them; this distress should only record those spaces that are wider than the normal space. If the gap is between two slabs that have faulted, record the fault instead of the gap distress. **Gaps should be counted in addition to other distress for the affected slabs.** Record the length of affected slabs in feet.

Figure 4L – Low Severity Gap

Figure 4H– High Severity Gap

(5) Joint Spalling

Description

Joint spalling is the breakdown of the slab edges within 6 inches of the joint. A spall usually does not extend vertically through the slab, but intersects the joint at an angle. Spalling results from:

1. Weak concrete at the joint caused by overworking
2. Water accumulation in the joint and freeze-thaw action
3. Excessive stresses at the joint caused by improper slab isolation

Severity Levels

Figures 5L and 5H show the severity levels of spalling. A frayed joint where the concrete has been worn away along the entire joint is rated as low severity.

L One of the following conditions exist: 1) the width of the spall (measured from the joint into the slab) is less than 2 inches, 2) less than 50% of the joint is affected, or 3) the spalled pieces are tight and cannot be removed easily

H The width of the spall (from the joint into the slab) is greater than 2 inches over 50% or more of the joint and the spalled pieces are loose or missing

How to Count

If spall is along the edge of one slab, it is counted as one slab with joint spalling. If spalling is on more than one edge of the same slab, the edge having the highest severity is counted and recorded as one slab. Joint spalling can also occur along the edges of two adjacent slabs. If this is the case, each slab is counted as having joint spalling. If the spall is the result of "D" cracking, record both distresses. **Joint spalling should be counted in addition to other distresses for the affected slabs.** Record the length of the affected slabs in fee.

Figure 5L – Low Severity Joint Spalling

(6) Linear Cracking

(Longitudinal, Transverse, and Diagonal Cracks)

Description

These cracks divide the slab into pieces and are usually caused by loading. Hairline cracks only a few feet long and not extending across the entire slab are counted as shrinkage cracks if they meet the criteria discussed in distress 11, Surface Defects.

Severity Levels

N Cracks with widths <1" and with no faulting at the crack

W Cracks with widths >1" and with no faulting at the crack

L Any width cracks faulted ½" to 1"

M Any width crack faulted 1" to 1 ½"

H Any width crack faulted 1 ½"and >

P Faulted cracks that have been patched and the patch material is in good condition

How to Count

After severity has been identified, the distress is recorded as one slab. Record the length of affected slabs in feet. **Count linear cracking in addition to other distresses for the affected slabs.** Do not count the faulted sections of a crack as a "Fault". Instead, record the appropriate severity for the linear cracking distress.

Figure 6N – Non-faulted Linear crack

Figure 6L – Low Severity Linear Crack

(7) Obstructions

Description

Obstructions are any structure or device that prevents the pedestrian from using at least a four foot section of a walk. Examples of obstructions include:

1. Poles located within a sidewalk
2. Fire Hydrants
3. Utility boxes
4. Storm drainage structures that are not flush with the adjacent walk
5. Street furniture

Severity Levels

There are no severity levels

How to Count

Each slab that has an obstruction should be counted. Slabs with more than one obstruction should still be counted as one slab. Slabs that have a minimum 4 ft horizontal clearance do not have obstructions. **Count obstructions in addition to other distresses for the affected slabs.** Record the length of affected slabs in feet.

Figure 7 - Obstructions

(8) Protruding Objects

Description

Protruding objects are those objects with leading edges more than 27 inches and not more than 80 inches above the surface of the walk that protrude more than 4 inches into the walk. These objects escape detection by blind pedestrians, and represent a hazard for them.

Severity Levels

There are no severity levels from protruding objects.

How to Count

Count each protruding object as one slab. Count protruding objects in addition to other distresses for the affected slabs. Record the length of affected slabs in feet.

Figure 8 – Protruding Objects
(Guy wire is 76" above walk)

(9) Settlements

Description

Settlements are two or more slabs of a sidewalk that have settled. These often are caused by the improper backfilling and compaction of a utility trench or pit. They should only be recorded at the point where they are clearly visible, and where they cause drainage, slope and ramp angle (counter slope) problems.

Severity

There are no severity levels for settlements.

How to Count

Count the number of slabs that have settled. One of the following conditions should be met before the distress is recorded:

1. The settlement creates a "bowl" that will not drain.
2. The counter slope (algebraic difference in grade) at the low point of the depression exceeds 11%. Thus if the entering slope were-6% and the leaving slope was +6% the counter slope would be 12% and the distress should be recorded. With 4 ft x 4 ft slabs, a settlement of 3 inches would produce a counter slope of 12%.

Record the length of the affected slabs in feet.
Record settlements in addition to other distresses for the affected slabs.

Figure 9 – Settlement

(10) Slope

Description

Slope is not necessarily a distress, but excessive slopes may cause a section of walk to violate Americans with Disability Act requirements as set forth in ADAAG.

Severity Levels

There are no severity levels. Actual numeric slope readings should be recorded. For each entry, a cross-slope (across the direction of travel) and longitudinal slope reading should be recorded in percent.

How to Count

At least one slope reading should be taken for each walk section in the sidewalk inventory. If the slope or cross slopes vary within a section a reading should be taken that is representative of each segment. Slope should be recorded as a percentage gradient. A one foot rise in 100 feet of run would be recorded as a 1.0% slope. Slope should be recorded to the nearest 0.1%.

Figure 10a – Measuring Cross Slope

Figure 10b – Measuring Longitudinal Slope

(11) Surface Defects

Description

Map cracking or crazing refers to a network of shallow, fine, or hairline cracks that extend only through the upper surface of the concrete. Shrinkage cracks are single examples of the same type of crack. The cracks tend to intersect at angles of 120 degrees. Map cracking or crazing is usually caused by concrete over-finishing, and may lead to surface scaling, which is the breakdown of the slab surface to a depth of approximately ¼ to ½ inches. Scaling may also be caused by de4icing salts, improper construction, freeze-thaw cycles, and poor aggregate. Popouts are voids at the surface caused by poor aggregate particles that disintegrate during freezing and thawing. The type of scaling defined here is not caused by "D" cracking. If scaling is caused by "D" cracking, it should be counted under that distress only.

Severity Levels

L Crazing, map cracking, popouts, or shrinkage cracks exists over most of the slab area; the surface is in good condition, with only minor scaling present (figure 11L)

H Slab is scaled over 25% of its area or scaling is more than ½" deep (figure 11H)

How to Count

A scaled slab is counted as one slab. Low-severity crazing should only be counted if the potential for scaling appears to be imminent, or a few small pieces come out. Record the length of affected slabs in feet.

Figure 11L – Low Severity Surface Defects (scaling is present in this photo)

Figure 11H – High Severity Surface Defects

Paver Brick Settlement (12)

Description:

Settlement of decorative paver brick strips in the downtown area: The settlements are caused because the pavers are set upon a sand base. The sand base has a tendency to move and fluctuate because of moisture and due to the freeze-thaw cycle.

Severity Levels:

The paver bricks are a long time maintenance problem which must be addressed several times a year. The bricks must be removed and then sand must be added to the base. The base is leveled so that the elevation of the brick is even with the adjacent sidewalk.

Problems of this type can be corrected when weather permits.

L > ½" and <1"

M 1" and <1 ½"

H 1 ½" and greater

Figure 12 – Paver Brick Settlement

(13) Longitudinal Faulting along curbs

Description:

Sections of sidewalk which have settled next to the adjacent curb: This type of settlement is due to the lack of proper compaction behind the curb at the time the sidewalk was poured. The settlement creates a difference in elevation between the sidewalk and the curb.

Severity Levels:

L > ½" and <1"

M 1" and <1 ½"

H 1 ½" and greater

P Fault has been patched

Measure the number of squares that need to be raised to be level with the curb. Squares can be replaced or possibly mud-jacked to eliminate the tripping hazard.

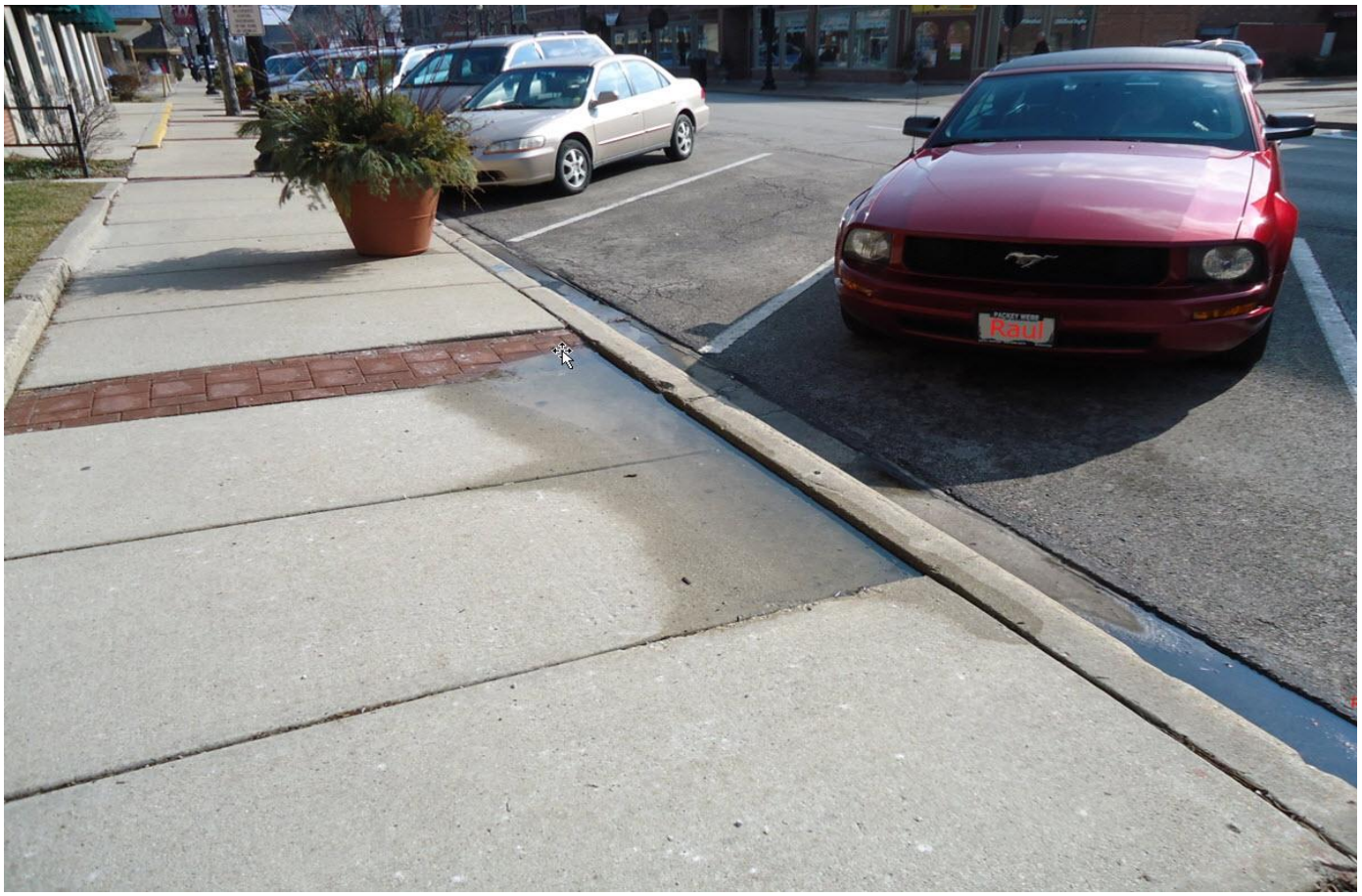

Figure 13 – Longitudinal Faulting Along Curbs

(14) Tree Grates

Obstructions are any structure or device that prevents the pedestrian from using at least a four foot section of walk. Any structure which is located in the walk and creates a tripping hazard for the pedestrian.

Examples of obstructions include:

Uneven tree grates which are not level with the sidewalk

Severity:

Due to the amount of pedestrian traffic in the downtown, any of these tree grates which are higher than the adjacent sidewalk are a potential problem.

L > ½" and <1"

M 1" and <1 ½"

H 1 ½" and greater

P Fault has been patched

The sidewalk squares completely around the tree grate usually must be replaced to eliminate the uneven situation. The existing metal frame must be removed and replaced with a poured concrete ledge as part of the sidewalk to hold the grates in position.

Figure 14 – Tree Grates

(15) Alley/Drive Approaches

Description:

Sidewalk and approach may be poured in one piece.

Problems may require the replacement of all concrete (not just sidewalk area).

Severity:

(Use typical sidewalk distress problems.)

L > ½" and <1"

M 1" and <1 ½"

H 1 ½" and greater

P Fault has been patched

Measure area to be replaced.

(Commercial drives and alleys in the CBD are to be 6" thick concrete.)

Figure 15 – Alley/Drive Approaches