530 FLOOD PROTECTION—Summary

Maximum credit: 1,600 points

Of the 1,600 points, credit for sewer backup protection projects is limited to 200 points and flood control techniques are limited to 1,000 points.

532 Elements

a. **Flood protection project technique used (TU_):** Credit is provided for retrofitting techniques or flood control techniques.

- **Retrofitting technique used:** Points are provided for the use of elevation (TUE), dry floodproofing (TUD), wet floodproofing (TUW), protection from sewer backup (TUS), and barriers (TUB)
- **Structural flood control technique used:** Points are provided for the use of channel modifications (TUC), and storage facilities (TUF).

b. **Flood protection improvement (FPI):** Credit points are determined for the difference between the level of flood protection provided before and after the project.

c. **Protected buildings (PB):** The value of TU is multiplied by the value of FPI for each building and used in the credit calculation.

Credit Calculation

There are two options for calculating the total points. Option 1 is used if the number of buildings eligible for credit is a small percentage of the total number of buildings in the floodplain. The maximum credit for Option 1 is 160 points.

Option 2 is used if the number of buildings eligible for credit is a larger percentage of the total number of buildings in the floodplain. The maximum credit for Option 2 is 1,600 points.

Impact Adjustment

There is no impact adjustment for this activity.

Documentation Provided by the Community

The documentation needed for this activity is described in Section 534.

530 FLOOD PROTECTION

The OBJECTIVE of this activity is to protect buildings from flood damage by

- Retrofitting the buildings so that they suffer no or minimal damage when flooded, and/or
- Constructing small flood control projects that reduce the risk of flood waters' reaching the buildings.

531 Background

Acquisition and relocation of flood-prone buildings is the surest method of both reducing flood damage and keeping people out of harm's way. It is credited under Activity 520 (Acquisition and Relocation). However, existing buildings can be protected on site, especially from shallow, slow-moving flood waters, by implementing one or more flood protection techniques.

This activity provides credit for buildings located in the floodplain that have been protected from flood damage by being retrofitted or by the placement of certain types of flood control structures that protect building(s) to at least the 25-year flood level.

531.a. Activity Description

This credit is based on the number of insurable buildings in the regulatory floodplain that have been retrofitted since the date of the community's original Flood Insurance Rate Map (FIRM). For the purposes of this activity, an accessory structure such as a garage or shed is not counted as an insurable building. Extra credit is given for protecting buildings on Federal Emergency Management Agency's (FEMA's) repetitive loss list (see Section 501) and for protecting buildings that are critical facilities.

Flood protection techniques used (TU) that are recognized by this activity include retrofitting projects and structural flood control projects (see Figure 530-1). The credit points are based on the effectiveness of the technique in preventing flood damage. The most effective techniques are elevation and those measures designed by a registered design professional.

Retrofitting projects, such as

- Elevating buildings above predicted flood levels,
- Dry floodproofing,
- Wet floodproofing,
- Protecting basements from sewer backup, and
- Barriers (for individual structures only), including levees, berms, and floodwalls.

Structural flood control projects, such as

- Channel modifications, including enlarging bridges and culverts;
- Storm drain improvements, including enclosing open channels;
- Diversions and other structural projects; and
- Small reservoirs, including retention and detention basins.

Figure 530-1. Flood protection techniques credited under Activity 530.

531.b. Activity Credit Criteria

The following criteria must be met to receive credit for this activity.

(1) All projects: Each flood protection project (retrofitting technique or structural flood control technique) must meet the following criteria:

(a) The protected building(s) must be an insurable building(s) (see Section 301);

(b) The project must have been completed after the effective date of the initial FIRM;

(c) The project must protect the building(s) from at least the 25-year flood;

(d) All required permits must have been issued for the project or the local permit officer must state in writing that the project complies with all federal, state, and local codes and regulations;

(e) For critical facilities, to receive the bonus credit the buildings must be protected to at least the 500-year flood level;

(f) If the project requires human intervention, there must be at least one hour of flood warning time plus the time it takes to install the measure. "Human intervention" means that a person is needed at the site to close an opening or install or operate a protection device before flood waters reach the building; and

(g) Credit is not provided for a retrofitted building or flood control project that is in disrepair or does not appear to be maintained.

(2) Retrofitting projects: In addition to the criteria in Section 531.b(1), the design of retrofitting projects for buildings located in the following high hazard areas must be signed and sealed by a registered design professional:

(a) V Zones, coastal A Zones, and areas seaward of the Limit of Moderate Wave Action (LiMWA);

(b) Areas with velocities greater than 5 feet per second during the 100-year event; and

(c) Areas subject to any of the special flood-related hazards listed in Section 401.

(3) Flood control projects: In addition to the criteria in Section 531.b(1), structural flood control projects must meet the following:

(a) The design and construction of the project must have been certified by a licensed professional engineer;

(b) The responsible agency must be implementing an operations and maintenance plan that was prepared for the project by a licensed professional engineer;

(c) If the flood control project lowers the base flood elevation shown on the FIRM, a request for a Letter of Map Revision (LOMR) must be submitted to FEMA, as required by the regulations of the National Flood Insurance Program (NFIP) at 44 *CFR* §65.3.

(d) The community must ensure that the impact of future development will not adversely affect the project's flood protection level. This can be done by either

(i) Enforcing watershed-wide regulations that prevent increases in stormwater runoff. This can be documented by receipt of credit for stormwater management

regulations under Activity 450 (Stormwater Management) (i.e., credit for SMR or WMP with an impact adjustment of 1.0 for the watershed upstream of the project). The design storm (DS) must be at least as large as the flood protection level for the project; or

(ii) Designing the project so that it will perform to its design protection level based on a watershed that is fully built out or developed in accord with an adopted long-range land use plan. The community must document that the protection level is still valid at each cycle verification; and

(e) Additional documentation may be required for the review of flood control projects that are unique to a community or region.

Environmental Protection and Historic Preservation

Because it is a FEMA program, the CRS must ensure that activities for which it provides credit are compliant with applicable federal environmental and historic preservation laws and executive orders. Section 507 expands on this requirement and presents a summary of FEMA's policy. Figure 500-5 lists the federal programs that should be considered during project development.

(4) Environmental compliance: Flood protection projects must adhere to applicable federal environmental and historic preservation laws and executive orders (see Section 507). CC-530EHP, Flood Protection, is a form on which the community certifies its compliance. The appropriate portions of the certification must be completed for all projects permitted or implemented after the effective date of the 2013 *CRS Coordinator's Manual* (April 1, 2013). CC-530EHP can be found in Appendix F or at www.CRSresources.org/500. Credit is not provided if the project was not in compliance with applicable federal laws and executive orders.

(5) Projects not credited: The following projects are NOT credited under this activity:

(a) Projects that protect to less than the 25-year flood level;

(b) Projects that protect buildings outside of the regulatory floodplain (except repetitive loss buildings);

(c) Post-FIRM buildings. Credit is not provided for post-FIRM buildings because the NFIP already requires that they be protected. However, if a post-FIRM building was retrofitted to protect it from a flood hazard not covered by the FIRM or NFIP regulations, credit is provided under this activity. For example, a post-FIRM building may have been constructed to the base flood elevation shown on an old FIRM, but the current base flood elevation is higher because of a recent restudy. If the building is elevated again to protect to the new base flood elevation, then the community could receive Activity 530 credit. However, constructing a new building to meet the community's flood protection requirements is not retrofitting;

(d) Projects implemented due to a requirement of the NFIP, such as elevating a substantially damaged or substantially improved residential building. The following are examples of how this rule is applied:

(i) Although elevating a building solely to meet the NFIP rules is not credited, credit is provided for bringing a noncompliant building into compliance if the project was implemented voluntarily or pursuant to a community action, such as providing financial assistance or declaring a dilapidated structure to be unsafe and uninhabitable.

(ii) Projects constructed to mitigate the adverse effect of not properly regulating new construction in accordance with a court order or an agreement with FEMA are not credited. Such an action would be considered one taken to meet the minimum requirements of the NFIP;

(e) If a building is removed but not replaced, and the parcel is preserved as open space, it can be counted toward credit under Activity 520 (Acquisition and Relocation). If a building is removed but not replaced, and the parcel is not preserved as open space, it can be counted toward TU1 because local codes will ensure that if anything is constructed, it will meet post-FIRM standards;

(f) Coastal structural projects, including seawalls, groins, and beach nourishment;

(g) Levees or floodwalls that protect more than one property. Levees are covered under Activity 620 (Levees);

(h) Dams that are not in compliance with the state's dam safety regulations; and

(i) Structural flood control projects owned AND operated by a federal agency. Credit is not provided for the major flood control works owned and operated by agencies such as the U.S. Army Corps of Engineers, Tennessee Valley Authority, and the Bureau of Reclamation. However, credit is provided for locally owned and operated projects that were partially funded by a federal agency.

(6) Regulatory floodplain: Credit is provided for buildings in the Special Flood Hazard Area (SFHA) shown on the current FIRM or preliminary FIRM, whichever is larger.

If the community has prepared an Impact Adjustment Map in accordance with Section 403 that shows flood-prone areas subject to regulation outside of the SFHA, then buildings in that regulatory floodplain may be counted for this credit. The community must demonstrate that these areas are currently regulated to at least the minimum standards of the NFIP.

A building that lies outside the regulatory floodplain because of remapping, completion of a flood control structure, or other activity is not eligible for this credit. Such a building has already benefited twice: it does not have a mandatory NFIP insurance purchase requirement; and if the owner chooses to purchase NFIP insurance, the premium will be based on the lower X-Zone rate.

532 Elements

The credit for Activity 530 is based on the combination of flood protection techniques used and the level of flood protection provided. Points are calculated for each protected building. Bonus points are provided for the protection of repetitive loss buildings and critical facilities. Credit is based on the elements described below.

532.a. Flood protection project technique used (TU)

Credit is provided for each building that has been protected by a retrofitting technique or a flood control project technique. It is symbolized as TU or, when a specific technique is being discussed, as TU plus another letter, such as TUE. Each building protected by a project will have a TU value. The value of TU is based on the technique used for each building and varies based on factors such as whether the project was designed by a registered design professional. The credited techniques (and the acronyms used for them) are shown in the Table 530-1.

Table 530-1. Flood protection techniques used.

Acronym (TU_)	Technique Used
TUE	Elevation
TUD	Dry floodproofing
TUW	Wet floodproofing
TUS	Sewer backup
TUB	Barrier, levee, or floodwall
TUC	Channel modification, storm sewer improvements, diversions
TUF	Storage facilities

The variation in the value for the technique used is based on the reliability of the project to prevent flood damage. For example, dry floodproofing is a less reliable retrofitting approach than elevation, so it is not worth as many points. Other methods and variations on these methods can be submitted for review to determine the credit points.

TU_#i = the type of technique used for building i

(1) Retrofitting technique used:

The value of the technique used is based on the retrofitting technique used. Credit criteria in Section 531.b must be met.

(a) TUE: Technique used for elevated buildings:

TUE = 1.0, if the building is elevated

(b) TUD: Technique used for buildings that are dry floodproofed (i.e., the walls and floor are made watertight so flood water does not enter the building):

TUD = 0.6, if the project was designed by a registered design professional and the design accounts for openings, internal drainage, seepage, and underdrainage
TUD = 0.4, if the project does not depend on human intervention to close openings; the project protects to a level less than 3 feet above the first floor; the design accounts for internal drainage, seepage, and underdrainage; and the building has no basement (i.e., any floor below grade on all sides)
TUD= 0.2, for all other cases, including those for which there is no documentation of how openings, interior drainage, seepage, or underdrainage are handled

(c) TUW: Technique used for buildings that are wet floodproofed (i.e., flood water is allowed into the building, but measures are taken to minimize damage):

TUW = 0.5, if the project was designed by a registered design professional
TUW = 0.3, if the project was not designed by a registered design professional
TUW = 0.2, if the furnace, water heater, electrical breaker box, and other utilities are relocated above flood level

(d) TUS: Technique used for buildings that are protected from sewer or sump backup:

TUS = 0.2, if the building is located in the SFHA
TUS = 0.1, for sewer backup prevention measures if the building is located outside of the SFHA and the community has a building code or other regulations that require positive drain sewers or other measures that prevent sewer backup into new buildings

A maximum of 200 points is provided under this activity for sewer backup prevention measures outside of the SFHA.

(e) TUB: Technique used for buildings protected by a barrier, including a levee, berm, or floodwall:

The following conditions must be met.

(i) The barrier must be located entirely on the property of the owner of the protected building(s).

This requirement ensures that those who are protected will maintain the levee or floodwall. When a barrier protects several neighbors but one of them neglects maintenance, all the properties are placed in jeopardy.

A barrier entirely on property owned by a condominium association would meet this requirement, but one on property owned by a homeowner's association that protects several privately owned homes would not.

(ii) The barrier must either have no openings (e.g., access is gained by going over the wall), have openings that close without human intervention, or have a written plan and adequate warning time so that available personnel are able to close the openings.

TUB = 0.8, if the barrier was designed, and the construction approved by, a registered design professional, and the design accounts for interior drainage, seepage, and underdrainage
TUB = 0.4, if the barrier was not designed by a registered design professional, but the design accounts for interior drainage, seepage, and underdrainage

(2) Structural flood control technique used (Maximum credit: 1,000 points):

The value of the technique used is based on the structural flood control technique. If more than one technique is used to protect a building, then TU = the lower of the techniques' values. Credit criteria in Section 531.b must be met.

(a) TUC: Technique used for buildings protected by a channel modification project, including diversions, enlarging bridges and culverts, and storm drain improvements:

A registered design professional must design the project and certify that no buildings are located in areas that would be affected by any increases in flood elevations caused by the project.

TUC = 0.8, if the project design provides at least one foot of clearance between the flood protection level and bridge decks, top of pipe, and other obstructions

TUC = 0.7, for pump systems and all other cases

(b) TUF: Technique used for buildings protected by a reservoir, detention basin, retention pond, or other flood water storage facility

TUF = 0.8, for all flood water storage facilities

If the flood water is stored behind a dam or other above-ground containment structure, then the community must document that the structure meets all state dam safety requirements. If the state does not have a dam safety program, then a registered design professional must certify that the structure meets the Corps of Engineers' dam safety criteria.

532.b. Flood protection improvement (FPI)

Flood protection improvement is a measure of the enhanced flood protection that a given project provides for a given building. It is symbolized as FPI#i.

Credit Calculation for FPI

For buildings on which any other flood protection measure was used, the credit is adjusted for the flood protection improvement provided to each building.

FPI#i = FPP#i – FPB#i, where

FPI#i = flood protection improvement for building i,

FPP = flood protection provided by the project, and

FPB = flood protection level before the project was constructed

The values for FPP and FPB are shown in Table 530-2.

Table 530-2. Values for FPP and FPB	
Flood Protection Level	**FPP or FPB**
Less than the 10-year flood	0.0
10-year flood, but less than the 25-year flood	0.3
25-year flood, but less than the 50-year flood	0.5
50-year flood, but less than the 100-year flood	0.7
100-year flood	0.8
100-year flood plus one foot of freeboard	0.9
100-year flood plus two or more feet of freeboard	1.0
500-year flood	1.0

The minimum value for FPP is 0.5. There is no credit for flood protection measures that protect to less than the 25-year flood level. For a repetitive loss property, it is assumed that the property was subject to flooding more frequent than every 10 years (less than the 10-year event), so FPB = 0. If the value of FPB cannot be determined (e.g., from Elevation Certificates or flood profiles), then it will be assumed that a 25-year flood protection level existed before the project (FPB = 0.5).

The flood protection level of a barrier is one foot below the top of the barrier.

If a basement is protected from sewer backup by an overhead sewer or backup valve, then FPP = 1.0.

Example 532.b-1.

(a) A building on a crawlspace was elevated from the 10-year flood elevation to two feet above the 100-year flood elevation.

FPP = 1.0, FPB = 0

FPI = FPP – FPB = 1.0 – 0 = 1.0

(b) A building has been protected by a 25-year berm (changing its protection level from 0 to the 25-year flood level).

FPP = 0.05, FPB = 0

FPI = FPP – FPB = 0.50 – 0 = 0.50

(c) A channel improvement lowers the 100-year flood by two feet. The buildings are now protected from the 100-year flood. Before the project the buildings were subject to flooding during the 50-year flood. The community applied to FEMA for a LOMR. Because the LOMR will result in the removal of the buildings from the SFHA there is no credit under this activity for the project. The community receives a lower base flood elevation and a smaller SFHA as the benefit.

Buildings that were in the community's regulatory floodplain will be in the X Zone and benefit from X-Zone insurance premiums. Buildings that remain in the SFHA are credited for the flood protection provided (see (d), below).

(d) Another building closer to the stream is affected by the same channel improvement. The two-foot drop in flood levels means that this building is now subject only to the 60-year flood instead of the 35-year flood. For that building,

FPP = 0.7, FPB = 0.5

FPI = FPP – FPB = 0.7 – 0.5 = 0.2

532.c. Protected buildings (PB)

A PB value is calculated for each protected building. It is the product of the TU value for each building multiplied by the FPI value for that building.

PBi = TU_ x FPI#i for each building protected using one or more of the techniques described in Section 531.a

PB = the sum of all PB#i

In the formula above, the letter "i" represents a given building. TU_#i is the credit for the flood protection technique used to protect building "i." The "_" stands for the letter for the technique used in Section 532.a (TUE, for example). When the formulae are completed, TU_#1 and FPI#1 will be the credits for building number 1. For example, if building number 24 were elevated, its credits would be TUE#24 and FPI#24. Their product is PB#24. If there are 52 protected buildings to be credited, then PB = ∑ PB#1 through PB#52 or the sum of the values for buildings #1 through #52.

The values for some protected buildings are modified by multipliers as follows.

(1) Repetitive loss property multiplier: If a protected building in the regulatory floodplain is also on the FEMA repetitive loss list, it is counted twice toward PB. If a protected building outside of the regulatory floodplain is also on the FEMA repetitive loss list, it is counted once toward PB.

Section 501 explains the FEMA repetitive loss list. It is a list of properties that have received multiple flood insurance claims. Communities with one or more properties on the repetitive loss list must review and update the list at each verification visit (see Section 211).

(2) Severe Repetitive Loss property multiplier: If a protected building is a Severe Repetitive Loss property and lies within the regulatory floodplain, it is counted three times toward PB. If a protected building lying outside the regulatory floodplain is also a Severe Repetitive Loss property, it is counted twice toward PB.

Multipliers (1) and (2) are provided only if the flood protection measure was sufficient to remove the property from the repetitive loss list. The repetitive loss data base must be updated to reflect the mitigation project, as explained in Section 501.

A community with no properties on the FEMA repetitive loss list is not eligible for these extra credits.

(3) Critical facilities multiplier: If a protected building is a critical facility it will receive credit based on the level of protection provided. If the flood protection provided (FPP) is the 500-year flood level or higher, critical facilities buildings are counted twice toward PB (bonus credit). The critical facility must be located in either the regulatory floodplain or the 500-year floodplain on the current FIRM or published preliminary FIRM, whichever shows a larger 500-year floodplain. For CRS credit purposes, "critical facilities" are defined in Section 120 (Glossary).

(4) Flood Mitigation Assistance grant multiplier: If a building was protected with funding support from FEMA's Flood Mitigation Assistance program, then the credit is 0.25 times the value of PB. This is explained in Section 506.

A worksheet is available at www.CRSresources.org/500 to help track retrofitted properties and their multipliers.

Example 532.c-1.

A community has protected 29 buildings from varying levels of flooding. Twenty buildings are protected from the 50-year flood with a channel improvement, and eight buildings subject to flooding every 10 years have been elevated above the 100-year flood level.

The public works garage is on the edge of the SFHA, above the 10-year flood level, but subject to shallow flooding during a 100-year flood. The department constructed a barrier around it to protect it from the 500-year flood. All buildings and projects meet the credit criteria of Sections 531.b and 532 for the technique used.

Three of the elevated buildings are on FEMA's repetitive loss list and a fourth is a Severe Repetitive Loss property. The public works garage is considered a critical facility because it is needed during a flood fighting operation.

For the 20 buildings protected from the 50-year flood by the channel improvement,

TUC#1–#20 = 0.80; FPP#1–#20 = 0.70; FPB#1–#20 = 0

FPI#1–#20 = FPP#1–#20 – FPB#1–#20 = 0.70 – 0 = 0.70

PB#1–#20 = TUC#1–#20 x FPI#1–#20 = 0.80 x 0.70 = 0.56

∑PB for 20 buildings = ∑PB#1–#20 = 20 x 0.56 = 11.20

Eight buildings are elevated to the 100-year flood level. Since there are three repetitive loss and one Severe Repetitive Loss buildings, they are counted as 8 + 3 + 2 = 13 buildings, and numbered as buildings #21 through #33.

TUE#21–#33 = 1.00, FPP#21–#33 = 0.80, FPB#21–#33 = 0,

FPI#21–#33 = FPP#21–#33 – FPB#21–#33 = 0.80 – 0 = 0.80

PB#21–#33 = TUE#21–#33 x FPI#21–#33 = 1.0 x 0.80 = 0.80

∑PB for 13 buildings = ∑PB#21 through PB#33 = 13 x 0.80 = 10.40

The public works garage is protected by a 500-year barrier. Because it is a critical facility, it is counted as two buildings, numbered 34 and 35.

TUB#34–#35 = 0.80, FPP#34–#35 = 1.00, FPB#34–#35 = 0.30,

FPI#34–#35 = FPP#34–#35 – FPB#34–#35 = 1.0 – 0.30 = 0.70

PB#34–#35 = TUB#34–#35 x FPI#34–#35 = 0.80 x 0.70 = 0.56

∑PB#34 through PB#35 = 2 x 0.56 = 1.12

PB = ∑PB#1–#35 = 11.20 + 10.40 + 1.12 = 22.72

533 Credit Calculation

There are two options for calculating the total credit for this activity. Option 1 is simplest but is limited to 160 points. It produces more credit in communities that have protected a small percentage of the buildings in their SFHAs. As long as a project meets the credit criteria, and the lowest-floor elevations of buildings protected before the project (flood protection level before the project (FPB)) were below the community's current effective base flood elevation, then Option 1 can be used.

Option 2 allows for higher credit in communities that have protected a large percentage of the buildings in their SFHAs. Option 2 must be used for projects in which the lowest-floor elevations of buildings protected before the project (flood protection level before the project (FPB)) were at or above the community's current effective base flood elevation.

A checklist is available at www.CRSresources.org/500 that can help when there are multipliers that increase the credit for certain buildings and with the impact adjustment calculations.

A community may use whichever option provides the larger credit, provided that the flood protection level before the project (FPB) is below the community's current effective base flood elevation. The maximum credit for Activity 530 using Option 1 is 160 and using Option 2 is 1,600.

533.a. Option 1

c530 =	2.4 x (the number of buildings that qualify for Activity 530 credit x the TU_ for the flood protection implemented for those buildings (Section 542.a))

The maximum credit under Option 1 is 160 points.

Example 533.a-1.

Using the same community as in Example 532.c-1, 29 buildings have been protected from varying levels of flooding. Twenty-eight buildings were elevated above the base flood elevation and to the freeboard elevation required by the community. Three of the elevated buildings are on FEMA's repetitive loss list and a fourth is a Severe Repetitive Loss property. The public works garage was wet floodproofed and is considered a critical facility because it is needed during a flood fighting operation.

Although 28 buildings were elevated, the three repetitive loss buildings are counted twice and the Severe Repetitive Loss building is counted

three times. The other 24 elevated buildings are counted once. This total gives the number of buildings that qualify for Activity 530 credit.

24 + (3 x 2) + (1 x 3) = 33 buildings that qualify for 530 credit

The public works garage is counted twice (because it was protected to the 500-year flood level).

c530 = (2.40 x 33 x TUE) + (2.40 x 2.00 x TUE)

c530 = (2.40 x 33 x 1.0) + (2.40 x 2.00 x 0.50) = 79.20 + 2.40 = 81.60

c530 = 82

533.b. Option 2

The credit calculation under Option 2 is based on the credit for all the buildings that have been protected as a percentage of all the buildings in the SFHA (bSF).

$$c530 = 16 \times \frac{PB \times 100}{bSF}, \text{ where}$$

PB is the sum of all PBi, and

bSF = the number of buildings in the SFHA

(1) The value for bSF is the number of buildings currently in the SFHA. bSF includes buildings that have been constructed in or annexed into the SFHA since the projects were completed. Note that communities are required to calculate and keep track of bSF as part of their annual recertification. Note also that if development is allowed in the SFHA, even if it is in compliance with the NFIP requirements, credit for this activity may decrease over time as bSF in the denominator increases.

There is a separate formula for calculating bSF in communities with a large number of post-FIRM buildings. It can be found in Section 303.

(2) The maximum credit for Option 2 is 1,600.

Example 533.b-1.

Using the same 29 buildings in Example 532.c-1, in a community with a relatively small number of buildings in the SFHA, 125.

PB = 22.72, bSF = 125

$$c530 = 16 \times \frac{PB \times 100}{bSF}$$

$$= 16 \times \frac{22.72 \times 100}{125} = 16 \times \frac{2{,}272}{125} = 16 \times 18.18 = 290.82$$

534 Documentation Provided by the Community

(1) At each verification visit,

(a) [For elevation projects] Copies of the Elevation Certificate for each elevated building.

(b) [For retrofitting projects other than elevation] A list of all buildings for which credit is requested and a signed Community Certification for Retrofitted Buildings (CC-530).

(c) [For structural flood control projects]

(i) The level of flood protection for each building to be credited, both before and after the project was installed or constructed.

(ii) [For buildings protected by a reservoir, detention basin, retention pond, or other facility that stores water above ground] A letter from the state dam safety office stating that the structure meets all state dam safety requirements. If there is no state dam safety office, then a registered design professional must certify that the project meets all appropriate dam safety criteria.

(d) A map showing the location of all protected buildings for which credit is being requested. This map is not necessarily the same as the Impact Adjustment Map prepared pursuant to Section 403. It need only show the part of the community in which buildings have been protected. The map for this activity does not need to show lot boundaries, unless the same map is used for Activity 520 (Acquisition and Relocation).

(e) Documentation of the implementation date for each project for which new credit is requested. A project is the building or group of buildings acquired or relocated within the same grant award, contract, or scope of work. A completed CC-530EHP, Certification of Compliance with Environmental and Historic Preservation for Flood Protection Projects, is needed for projects implemented after the implementation date of the 2013 *Coordinator's Manual* (see Section 507). The form can be found in Appendix F or at www.CRSresources.org/200.

(f) [If the community is using Option 2 under Section 532.b] Calculations showing the total number of buildings in the SFHA (bSF).

NOTE: *The variable bSF must have the same value as bSF in Activities 510, 520, and 610.*

(g) [For credit for protecting non-repetitive loss buildings located outside the SFHA] Documentation that shows that floodplain regulations are in effect in the area outside the SFHA.

(h) [If the flood control project revised the base flood elevation] A copy of the request for a CLOMR submitted to FEMA.

535 For More Information

a. Additional information, reference materials, checklists, and examples can be found at www.CRSresources.org/500.

b. FEMA and the Corps of Engineers have many references on elevating and retrofitting buildings. FEMA's references can be found at www.fema.gov/building-science/building-science-publications-flood/wind. For a list of the Corps documents, go to www.usace.army.mil/Missions/CivilWorks/ProjectPlanning/nfpc.aspx then scroll down to "NFPC Publications."

c. Several states have published their own floodproofing or retrofitting manuals and some have programs to help fund or otherwise assist property owners. State NFIP Coordinators are listed at www.floods.org/index.asp?menuID=274.

d. The Emergency Management Institute (EMI) is a FEMA training center located in Emmitsburg, Maryland. It offers a four-day course on retrofitting techniques oriented to engineers and experienced building professionals as well as courses on FEMA financial assistance programs, including application procedures and benefit/cost analyses. Stipends to cover travel, registration, and rooms are usually available from FEMA for federal, state, and local officials. EMI also offers field-deployed and independent study versions of many of its subjects, which are also free. For more information, see the EMI website at https://training.fema.gov/emi.aspx.

536 Related Activities under the Community Rating System

- A first step to working with a property owner is to provide property protection advice that includes a discussion of alternatives and sources of financial assistance. This is credited under Activity 360 (Flood Protection Assistance).
- Flood control projects that change the base flood elevation may result in revisions to the community's FIRM. Such revisions may or may not receive credit under Activity 410 (Flood Hazard Mapping). Activity 410 lists criteria for credit due to changes in the base flood elevation.
- A floodplain management plan (FMP) or a repetitive loss area analysis (RLAA) credited under Activity 510 (Floodplain Management Planning) can identify projects for flood protection. The RLAA can identify properties that receive bonus credit under Activity 530.
- A multi-hazard mitigation plan credited under Activity 510 (Floodplain Management Planning) is a prerequisite for FEMA funding for creditable retrofitting projects.