Oregon Schools Seismic Feedback Form

PART 1 - GENERAL INFORMATION

1. Date of submittal

September 24, 2014

2. County

Clackamas

3. School district or special education district

Lake Oswego School District

4. Name and title of person submitting report

Stuart Ketzler
Executive Director of Finance

5. Year for reporting – Please submit a separate form for each school report

FY 2014

Click here to mail the completed form to DOGAMI

PART 2 - REPLACED STRUCTURES

6. Did the district REPLACE any school structures with new buildings during the reporting year?

Yes ◯ *If yes, be sure to complete a separate seismic feedback form for EACH structure that was replaced.*

No ◉ *If no, go to page 3.*

i. Name and address of the school where structure was replaced

ii. Exact structure or structures that were replaced (for example, gymnasium, main building, etc.)

iii. Type of replacement building (for example, tilt-up, masonry, wood frame, etc.)

iv. Maximum occupancy of new structure

v. Date the new structure became occupied

PART 3 - MODIFIED STRUCTURES

7. Did the district MODIFY an existing school building in a manner that may affect the seismic risk category of a school?

Yes ○ *If yes, be sure to complete a separate seismic feedback form for EACH structure that was modified.*

No ◉ *If no, you are finished. Please go to page 1 for submittal instructions.*

i. Name and address of the school where structure was modified

Bryant Elementary
4750 Jean Rd
Lake Oswego OR 97035

ii. Exact structure or structures that were modified (for example, gymnasium, main building, etc.)

Whole Building Assessment

iii. Type of modification to the building (for example, awnings anchored, structural reinforcement, etc.)

A 2008 analysis by Froelich Consulting Engineers shows the DOGAMI FEMA 154 score of 0.9 is incorrect - the correct score is 2.9

iv. Date the structure was re-occupied after modification

Continuously occupied

c. Optional: Submit a copy of the seismic rehabilitation or structural engineering report

Please attach to email when you submit this form.

d. Optional: Cost and method of seismic rehabilitation funding (grant through Seismic Rehabilitation Grant Program, local school bond, etc.)

N/A

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CENTRAL OREGON □
745 NW Mt. Washington Dr., Suite 204
Bend, Oregon 97701
541.383-1828/541.383-7696 FAX

Memorandum

To: Mr. Stuart Ketzler
From: Timothy T. Terich, P.E., S.E.
Date: August 28, 2008
Project: Lake Oswego School District – DOGAMI Seismic Screening
FCE #: 08-T019
Client: LOSD
Subject: Dissemination of DOGAMI Reports

Introduction:

The Lake Oswego School District commissioned Froelich Consulting Engineers to assist with the interpretation of the *FEMA 154 - Rapid Visual Screening Report* that was prepared in 2007 for all Lake Oswego schools by the Oregon Department of Geology and Mineral Industries (DOGAMI). Our memo explains how the screening method is done and what the results mean. FCE has worked closely with the Lake Oswego School District in the past, and have an intimate knowledge of most of the school structural systems in the district.

Purpose of the *FEMA Rapid Visual Screening*:

This seismic screening program and guidebook was created by FEMA to provide a preliminary method for identifying potentially high seismic risk buildings. Screening is used as a quick evaluation method to serve as the first step in a pre-disaster mitigation strategy. The FEMA guidebook states that "*Buildings identified by this procedure are not necessarily at risk, but should be analyzed in more detail by an experienced structural engineer.*"

Rapid Visual Screening of Lake Oswego Schools:

Based on rapid visual screening, five elementary and two junior high schools scored in the high seismic risk range by DOGAMI. The scores for these seven buildings ranged between 0.5 and 0.9. The screening method recommends that a building be flagged as high risk if it scores below 2. However, the "cut-off" score of 2.0 is not given as an absolute value and can be determined by individual communities based on an evaluation of cost vs. risk. Buildings typically score in the range of 0 to 7.

The following are the schools flagged as high risk by DOGAMI along with their associated original scores:

	Score
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How The Screening Is Done:

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How Buildings are Scored:

The following explains how the screener determines a building score using the 'Rapid Visual Screening Method". Answers to the following two questions determine the base score for a building. The base scores for a building range from 1.8 for unreinforced masonry construction to 4.4 for light wood-framed buildings 5,000 square feet or smaller.

1. *What seismic region is the building located in?* This is determined from a map found in the handbook and determines the seismic level as low, medium and high.

2. *What type of construction material is used to brace the building laterally?* (Example: Wood shear walls, CMU shear walls, steel frames). This is determined by visual means.

Answers to questions 3-7 modify the building base score.

3. *How many stories tall is the building?* Buildings over 4 stories in height get additional points added to their score. The reason given for this by the manual is that taller buildings generally have better designs and better construction.

4. *Does the building have a vertical irregularity?* This category is in reference to the layout of the lateral bracing elements. This is a difficult item to determine just by looking at the building. Often it is necessary to know how the building is designed to determine if there is a vertical irregularity or if there is a possibility one is present. If a vertical irregularity is apparent, a large point deduction is taken from the building's score.

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7. *Is the building post-benchmark?* Similar to the "pre-building code" item above, points are given if the building was constructed after significant improvements in seismic building codes.

8. *What is the soil type?* For this report, the soil type is generally determined by using geologic and geotechnical maps. Points are deducted for all soil types other than "hard rock" and "average rock".

The final score is determined by adding the score modifiers to the base score.

Example: Waluga Junior High School – built in 1964

Base score - Light framed wood structure larger than 5,000 square feet.	3.8
Vertical Irregularity – The screener said yes:	-2
Plan Irregularity – The screener said yes:	-0.5
Pre-Code? - The screener said no:	0
Post-benchmark? - The screener said no:	0
Soil type: C – soft rock and very dense soil	-0.4
Total Score:	0.9

What is seismic risk?

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Each of the Lake Oswego schools was built to meet the design requirements of the code governing at the time of construction. For example, Bryant Elementary was built in 1966 and thus was built per the code governing in 1966. The structural codes change every few years. Typically an aging building will not meet the current structural codes. However, most jurisdictions, including Lake Oswego, do not require that buildings be upgraded to current codes unless there is a change in occupancy or a large remodel is done. We do know that structural walk-thrus for many of these schools have been done in recent years.

FCE Report Findings:

FCE reviewed the scoring given by DOGAMI to each of the seven Lake Oswego elementary and junior high school buildings identified as high risk. We evaluated this against the actual building plans and our knowledger of each of the schools. We found the scores assigned by DOGAMI to each of the schools to be low. Based on the screening criteria, we found that the buildings should have scored in the range of 2.5 to 3.5, which is in the moderate to low risk range. All of the buildings were marked as having a "vertical irregularity". In review of each of the buildings, none were found to have a significant "vertical irregularity". This item alone brings the scores for all of the schools above 2 – which is the "cut-off" score designating high seismic risk buildings from moderate risk buildings.

Oak Creek Elementary school was built in 1991. It was not given credit in the report as being "Post-Bench" even though it was built since major seismic updates to the code. This increases the score for this school to 3.5. See Appendix #1 of this report for a comparison of the DOGAMI scores to our revised scores.

From a general standpoint we do not feel that the schools flagged by the screening are scored correctly. Six of the seven schools are one story tall, light framed wood construction. This type of construction, compared to other building types, is at the low end of seismic risk as compared to "brittle" unreinforced masonry structures found in other districts. The seventh school, Oak Creek Elementary is a steel framed building and was built in 1991. This school was built since substantial updates to the seismic provisions of the building codes.

Summary:

The Rapid Visual Screening method is a "drive-by" evaluation of the seismic risk of a building. The Oregon State Senate passed a bill calling for all of the Oregon schools to be evaluated per the Rapid Visual Screening method as the first step in a pre-disaster mitigation strategy. This screening is not set up to give a conclusive evaluation of seismic risk. It is based on a very simple evaluation and is only to be used as an initial screening. We reviewed the scores

Appendix 1

Lake Oswego School District - DOGAMI seismic screening

The following table shows the scores assigned to each of the schools using the FEMA 154 -Rapid Visual Screening method. The 2nd column shows the score given by DOGAMI, the 3rd column shows the score FCE would assign to each school using the same criteria.

School		DOGAMI score		FCE Score
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Forest Hills Elementary
1133 Andrews Rd
Lake Oswego OR 97034

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Whole Building Assessment

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Lake Grove Elementary
15777 Boones Ferry Rd
Lake Oswego OR 97035

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Summary:

The Rapid Visual Screening method is a "drive-by" evaluation of the seismic risk of a building. The Oregon State Senate passed a bill calling for all of the Oregon schools to be evaluated per the Rapid Visual Screening method as the first step in a pre-disaster mitigation strategy. This screening is not set up to give a conclusive evaluation of seismic risk. It is based on a very simple evaluation and is only to be used as an initial screening. We reviewed the scores

Appendix 1

Lake Oswego School District - DOGAMI seismic screening

The following table shows the scores assigned to each of the schools using the FEMA 154 -Rapid Visual Screening method. The 2nd column shows the score given by DOGAMI, the 3rd column shows the score FCE would assign to each school using the same criteria.

School		DOGAMI score		FCE Score
Oak Creek Elementary		0.6		3.5
Waluga Junior High		0.9		2.9
Forest Hills Elementary		0.5		2.5
River Grove Elementary		0.9		2.9
Bryant Elementary		0.9		2.9
Lake Oswego Junior High		0.9		2.9
Lake Grove Elementary		0.9		2.9

Oregon Schools Seismic Feedback Form

PART 1 - GENERAL INFORMATION

1. Date of submittal

September 24,2014

2. County

Clackamas

3. School district or special education district

Lake Oswego School District

4. Name and title of person submitting report

Stuart Ketzler
Executive Director of Finance

5. Year for reporting – Please submit a separate form for each school report

FY 2014

Instructions: *Fill out a separate seismic feedback form for each school in your district that has replaced or modified buildings. Submit completed forms to: seismic.feedback@dogami.state.or.us*

Click here to mail the completed form to DOGAMI

Thank you for your cooperation!

PART 2 - REPLACED STRUCTURES

6. Did the district REPLACE any school structures with new buildings during the reporting year?

Yes ○ *If yes, be sure to complete a separate seismic feedback form for EACH structure that was replaced.*

No ◉ *If no, go to page 3.*

i. Name and address of the school where structure was replaced

ii. Exact structure or structures that were replaced (for example, gymnasium, main building, etc.)

iii. Type of replacement building (for example, tilt-up, masonry, wood frame, etc.)

iv. Maximum occupancy of new structure

v. Date the new structure became occupied

PART 3 - MODIFIED STRUCTURES

7. Did the district MODIFY an existing school building in a manner that may affect the seismic risk category of a school?

Yes ○ *If yes, be sure to complete a separate seismic feedback form for EACH structure that was modified.*

No ◉ *If no, you are finished. Please go to page 1 for submittal instructions.*

i. Name and address of the school where structure was modified

Oak Creek Elementary
55 Kingsgate
Lake Oswego, OR 97035

ii. Exact structure or structures that were modified (for example, gymnasium, main building, etc.)

Whole Building Assessment

iii. Type of modification to the building (for example, awnings anchored, structural reinforcement, etc.)

A 2008 analysis by Froelich Consulting Engineers shows the DOGAMI FEMA 154 score of 0.6 is incorrect - the correct score is 3.5

iv. Date the structure was re-occupied after modification

Continuously occupied

c. Optional: Submit a copy of the seismic rehabilitation or structural engineering report

Please attach to email when you submit this form.

d. Optional: Cost and method of seismic rehabilitation funding (grant through Seismic Rehabilitation Grant Program, local school bond, etc.)

N/A

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CENTRAL OREGON □
745 NW Mt. Washington Dr., Suite 204
Bend, Oregon 97701
541.383-1828/541.383-7696 FAX

Memorandum

To:	Mr. Stuart Ketzler
From:	Timothy T. Terich, P.E., S.E.
Date:	August 28, 2008
Project:	Lake Oswego School District – DOGAMI Seismic Screening
FCE #:	08-T019
Client:	LOSD
Subject:	Dissemination of DOGAMI Reports

Introduction:

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Purpose of the *FEMA Rapid Visual Screening*:

This seismic screening program and guidebook was created by FEMA to provide a preliminary method for identifying potentially high seismic risk buildings. Screening is used as a quick evaluation method to serve as the first step in a pre-disaster mitigation strategy. The FEMA guidebook states that *"Buildings identified by this procedure are not necessarily at risk, but should be analyzed in more detail by an experienced structural engineer."*

Rapid Visual Screening of Lake Oswego Schools:

Based on rapid visual screening, five elementary and two junior high schools scored in the high seismic risk range by DOGAMI. The scores for these seven buildings ranged between 0.5 and 0.9. The screening method recommends that a building be flagged as high risk if it scores below 2. However, the "cut-off" score of 2.0 is not given as an absolute value and can be determined by individual communities based on an evaluation of cost vs. risk. Buildings typically score in the range of 0 to 7.

The following are the schools flagged as high risk by DOGAMI along with their associated original scores:

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How Buildings are Scored:

The following explains how the screener determines a building score using the 'Rapid Visual Screening Method". Answers to the following two questions determine the base score for a building. The base scores for a building range from 1.8 for unreinforced masonry construction to 4.4 for light wood-framed buildings 5,000 square feet or smaller.

1. *What seismic region is the building located in?* This is determined from a map found in the handbook and determines the seismic level as low, medium and high.

2. *What type of construction material is used to brace the building laterally?* (Example: Wood shear walls, CMU shear walls, steel frames). This is determined by visual means.

Answers to questions 3-7 modify the building base score.

3. *How many stories tall is the building?* Buildings over 4 stories in height get additional points added to their score. The reason given for this by the manual is that taller buildings generally have better designs and better construction.

4. *Does the building have a vertical irregularity?* This category is in reference to the layout of the lateral bracing elements. This is a difficult item to determine just by looking at the building. Often it is necessary to know how the building is designed to determine if there is a vertical irregularity or if there is a possibility one is present. If a vertical irregularity is apparent, a large point deduction is taken from the building's score.

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The final score is determined by adding the score modifiers to the base score.

Example: Waluga Junior High School – built in 1964

Base score - Light framed wood structure larger than 5,000 square feet.	3.8
Vertical Irregularity – The screener said yes:	-2
Plan Irregularity – The screener said yes:	-0.5
Pre-Code? - The screener said no:	0
Post-benchmark? - The screener said no:	0
Soil type: C – soft rock and very dense soil	-0.4
Total Score:	0.9

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Oregon Schools Seismic Feedback Form

PART 1 - GENERAL INFORMATION

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September 24, 2014

2. County

Clackamas

3. School district or special education district

Lake Oswego School District

4. Name and title of person submitting report

Stuart Ketzler
Executive Director of Finance

5. Year for reporting – Please submit a separate form for each school report

FY 2014

Click here to mail the completed form to DOGAMI

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7. Did the district MODIFY an existing school building in a manner that may affect the seismic risk category of a school?

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River Grove Elementary
5850 McEwan Rd
Lake Oswego OR 97035

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Whole Building Assessment

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Memorandum

To: Mr. Stuart Ketzler
From: Timothy T. Terich, P.E., S.E.
Date: August 28, 2008
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FCE #: 08-T019
Client: LOSD
Subject: Dissemination of DOGAMI Reports

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Oregon Schools Seismic Feedback Form

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2500 Country Club Rd
Lake Oswego OR 97034

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Whole Building Assessment

iii. Type of modification to the building (for example, awnings anchored, structural reinforcement, etc.)

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Vertical Irregularity – The screener said yes:	-2
Plan Irregularity – The screener said yes:	-0.5
Pre-Code? - The screener said no:	0
Post-benchmark? - The screener said no:	0
Soil type: C – soft rock and very dense soil	-0.4
Total Score:	0.9

What is seismic risk?

Who and what determines acceptable seismic risk? Engineers design buildings to the current structural code. The level of design that the code requires is based on the probability of a certain magnitude earthquake. This doesn't mean that a larger earthquake than the one designed for won't come along. Society and design professionals have come together and determined what is acceptable risk vs. the cost of construction.

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FCE reviewed the scoring given by DOGAMI to each of the seven Lake Oswego elementary and junior high school buildings identified as high risk. We evaluated this against the actual building plans and our knowledger of each of the schools. We found the scores assigned by DOGAMI to each of the schools to be low. Based on the screening criteria, we found that the buildings should have scored in the range of 2.5 to 3.5, which is in the moderate to low risk range. All of the buildings were marked as having a "vertical irregularity". In review of each of the buildings, none were found to have a significant "vertical irregularity". This item alone brings the scores for all of the schools above 2 – which is the "cut-off" score designating high seismic risk buildings from moderate risk buildings.

Oak Creek Elementary school was built in 1991. It was not given credit in the report as being "Post-Bench" even though it was built since major seismic updates to the code. This increases the score for this school to 3.5. See Appendix #1 of this report for a comparison of the DOGAMI scores to our revised scores.

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Summary:

The Rapid Visual Screening method is a "drive-by" evaluation of the seismic risk of a building. The Oregon State Senate passed a bill calling for all of the Oregon schools to be evaluated per the Rapid Visual Screening method as the first step in a pre-disaster mitigation strategy. This screening is not set up to give a conclusive evaluation of seismic risk. It is based on a very simple evaluation and is only to be used as an initial screening. We reviewed the scores

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Lake Oswego School District - DOGAMI seismic screening

The following table shows the scores assigned to each of the schools using the FEMA 154 -Rapid Visual Screening method. The 2nd column shows the score given by DOGAMI, the 3rd column shows the score FCE would assign to each school using the same criteria.

School		DOGAMI score		FCE Score
Oak Creek Elementary		0.6		3.5
Waluga Junior High		0.9		2.9
Forest Hills Elementary		0.5		2.5
River Grove Elementary		0.9		2.9
Bryant Elementary		0.9		2.9
Lake Oswego Junior High		0.9		2.9
Lake Grove Elementary		0.9		2.9

Oregon Schools Seismic Feedback Form

PART 1 - GENERAL INFORMATION

1. Date of submittal

September 24, 2014

2. County

Clackamas

3. School district or special education district

Lake Oswego School District

4. Name and title of person submitting report

Stuart Ketzler
Executive Director of Finance

5. Year for reporting – Please submit a separate form for each school report

FY 2014

Click here to mail the completed form to DOGAMI

PART 2 - REPLACED STRUCTURES

6. Did the district REPLACE any school structures with new buildings during the reporting year?

Yes ○ *If yes, be sure to complete a separate seismic feedback form for EACH structure that was replaced.*

No ◉ *If no, go to page 3.*

i. Name and address of the school where structure was replaced

ii. Exact structure or structures that were replaced (for example, gymnasium, main building, etc.)

iii. Type of replacement building (for example, tilt-up, masonry, wood frame, etc.)

iv. Maximum occupancy of new structure

v. Date the new structure became occupied

PART 3 - MODIFIED STRUCTURES

7. Did the district MODIFY an existing school building in a manner that may affect the seismic risk category of a school?

Yes ○ *If yes, be sure to complete a separate seismic feedback form for EACH structure that was modified.*

No ◉ *If no, you are finished. Please go to page 1 for submittal instructions.*

i. Name and address of the school where structure was modified

Waluga Junior High School
4700 Jean Rd
Lake Oswego OR 97035

ii. Exact structure or structures that were modified (for example, gymnasium, main building, etc.)

Whole Building Assessment

iii. Type of modification to the building (for example, awnings anchored, structural reinforcement, etc.)

A 2008 analysis by Froelich Consulting Engineers shows the DOGAMI FEMA 154 score of 0.9 is incorrect - the correct score is 2.9

iv. Date the structure was re-occupied after modification

Continuously occupied

c. Optional: Submit a copy of the seismic rehabilitation or structural engineering report

Please attach to email when you submit this form.

d. Optional: Cost and method of seismic rehabilitation funding (grant through Seismic Rehabilitation Grant Program, local school bond, etc.)

N/A

Thank you! Please return to page 1 for instructions on submitting this form.

FCE
FROELICH
CONSULTING
ENGINEERS, INC

MAIN OFFICE □
6969 SW Hampton Street
Tigard, Oregon 97223
503.624-7005/503.624-9770 FAX

CENTRAL OREGON □
745 NW Mt. Washington Dr., Suite 204
Bend, Oregon 97701
541.383-1828/541.383-7696 FAX

Memorandum

To:	Mr. Stuart Ketzler
From:	Timothy T. Terich, P.E., S.E.
Date:	August 28, 2008
Project:	Lake Oswego School District – DOGAMI Seismic Screening
FCE #:	08-T019
Client:	LOSD
Subject:	Dissemination of DOGAMI Reports

Introduction:

The Lake Oswego School District commissioned Froelich Consulting Engineers to assist with the interpretation of the *FEMA 154 - Rapid Visual Screening Report* that was prepared in 2007 for all Lake Oswego schools by the Oregon Department of Geology and Mineral Industries (DOGAMI). Our memo explains how the screening method is done and what the results mean. FCE has worked closely with the Lake Oswego School District in the past, and have an intimate knowledge of most of the school structural systems in the district.

Purpose of the *FEMA Rapid Visual Screening*:

This seismic screening program and guidebook was created by FEMA to provide a preliminary method for identifying potentially high seismic risk buildings. Screening is used as a quick evaluation method to serve as the first step in a pre-disaster mitigation strategy. The FEMA guidebook states that "*Buildings identified by this procedure are not necessarily at risk, but should be analyzed in more detail by an experienced structural engineer.*"

Rapid Visual Screening of Lake Oswego Schools:

Based on rapid visual screening, five elementary and two junior high schools scored in the high seismic risk range by DOGAMI. The scores for these seven buildings ranged between 0.5 and 0.9. The screening method recommends that a building be flagged as high risk if it scores below 2. However, the "cut-off" score of 2.0 is not given as an absolute value and can be determined by individual communities based on an evaluation of cost vs. risk. Buildings typically score in the range of 0 to 7.

The following are the schools flagged as high risk by DOGAMI along with their associated original scores:

	Score
Oak Creek Elementary	0.6
Waluga Junior High	0.9
Forest Hills Elementary	0.5
River Grove Elementary	0.9
Bryant Elementary	0.9
Lake Oswego Junior High	0.9
Lake Grove Elementary	0.9

How The Screening Is Done:

The screening method consists of a one page data collection form. An engineer is not required to perform the screening and can be implemented by "anyone". The form can be filled out in minutes and does not require the evaluator to physically enter the building. Only a few basic facts, such as the year of construction and general soils maps, are required.

How Buildings are Scored:

The following explains how the screener determines a building score using the 'Rapid Visual Screening Method". Answers to the following two questions determine the base score for a building. The base scores for a building range from 1.8 for unreinforced masonry construction to 4.4 for light wood-framed buildings 5,000 square feet or smaller.

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