© JUL 2026 | IRE Journals | Volume 10 Issue 1 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV10I1-1720181

Analysis of DILG Harmonized Infrastructure Audit Reports for Selected Public Buildings in Cabanatuan City: Inspection Priorities, Seismic Referrals, and Egress Findings

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Abstract- This study examined 53 building-level reports generated using the Department of the Interior and Local Government (DILG) Harmonized Infrastructure Audit Tool (HIAT) for selected public buildings in Cabanatuan City. Using a cross-sectional descriptive-evaluative design, the analysis covered Form 1 Inspection Prioritization Ratings (IPR), construction-period groups, Form 2A Rapid Visual Screening (RVS) scores and referral recommendations, and readable Form 2B egress and life-safety entries. The mean IPR was 53.8 ± 9.4 (range, 33-70). The only building constructed before 1992 had an IPR of 65.0, while the mean IPR was 55.3 for buildings constructed from 1992 to 2010 (n = 17) and 52.7 for those constructed after 2010 (n = 35). Of the 52 reports with generated RVS scores, the mean was 2.37 ± 0.30; two reports (3.8%) scored below 2.0, and two others scored exactly 2.0. Despite this, 43 of all 53 reports (81.1%) recommended detailed structural evaluation or investigation. This wide difference shows that the referral outcome cannot be understood from the numerical cut-off alone, although the specific reason for referral was not consistently documented. The most common readable Form 2B adverse findings involved directional signs (39/41, 95.1%), fire-exit doors (35/38, 92.1%), exit signs (40/44, 90.9%), exit illumination (31/37, 83.8%), and emergency exits (18/38, 47.4%). The results support more focused records review, corrective maintenance, and professional follow-up. They should not be interpreted as a declaration that any individual building is structurally safe or unsafe.

Index Terms— Cabanatuan City, Infrastructure Audit, Public Buildings, Rapid Visual Screening, Seismic Vulnerability, Risk-Based Prioritization, Egress Safety.

I. INTRODUCTION

Public buildings are central to everyday government services, education, health care, public safety, and emergency response. During a disaster, many of these facilities also take on additional roles as evacuation sites, coordination centers, treatment areas, or temporary locations for essential services. When such a building is damaged or cannot be accessed, the consequences extend beyond the structure itself: people may be placed at risk, and critical public functions may be interrupted [7], [9].

Earthquake risk does not arise from ground motion alone. It reflects the combined effects of the hazard, the vulnerability of the building, and the number and importance of the people and services exposed. Ground shaking, surface faulting, liquefaction, and earthquake-induced landslides are hazard processes. Structural irregularities, pounding potential, falling components, deterioration, and inadequate egress, by contrast, are conditions that can increase the consequences of those hazards. The Spectral Acceleration Maps of the Philippines provide hazard-sensitive information that supports engineering assessment and design [4].

To bring greater consistency to local infrastructure assessment, the Department of the Interior and Local Government (DILG), through its Office of Project Development Services (OPDS), implements the Infrastructure Audit Program and uses the Harmonized Infrastructure Audit Tool (HIAT) to

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standardize building screening by local government units [1], [2]. The HIAT follows a staged process. Form 1 assigns an Inspection Prioritization Rating based on fault proximity, liquefaction susceptibility, occupancy type, occupant load, and construction year. Form 2A applies rapid visual screening principles adapted from FEMA P-154, while Form 2B records structural, non-structural, life-safety, environmental, and facility-management observations [2], [3]. These forms help determine where attention is needed; they do not replace detailed structural evaluation, materials testing, geotechnical investigation, or a formal code-compliance assessment.

Rapid visual screening is intended to identify buildings that may warrant closer examination, not to certify that a building is safe. Studies involving hospitals in Manila and other building inventories show that RVS can be a useful first-stage decision tool, but they also show that scores must be interpreted considering the assigned building type, score modifiers, local adaptations, and the quality of the field data [5], [6]. A numerical score viewed in isolation may therefore miss other observations or referral conditions captured elsewhere in the audit record.

Against this background, the present study reviewed the complete IA output available for selected public buildings in Cabanatuan City. The analysis separates inspection priority from seismic screening, examines the difference between the numerical RVS result and the recorded referral recommendation, and summarizes recurring Form 2B egress and life-safety observations. Its purpose is to support practical decisions on inspection scheduling, records improvement, maintenance, and professional follow-up. It is not intended to label any individual facility as safe or unsafe.

A. Objectives of the Study

Specifically, the study aimed to:

1. Describe the selected audited buildings and their principal Form 1 risk criteria, including occupancy, construction period, fault proximity, liquefaction susceptibility, and occupant load.

2. Summarize the Form 1 IPR and Form 2A RVS scores recorded in the IA reports.

3. Examine how the Form 1 construction-year weighting is reflected in total IPR values across the prescribed construction-period groups.

4. Compare the proportion of generated RVS scores below 2.0 with the proportion of reports carrying a recommendation for detailed structural evaluation or investigation, while keeping the denominators explicit.

5. Identify the most frequently recorded Form 2B egress and life-safety adverse findings and show how missing or illegible entries affect their interpretation.

II. MATERIALS AND METHODS

A. Research Design, Setting, and Data Source

The study used a cross-sectional, descriptive-evaluative design and treated each completed building-level IA report as one unit of analysis. In total, 53 administrative reports generated in 2025-2026 for public buildings in Cabanatuan City were included. These reports covered public schools, health facilities, government offices, police or fire facilities, and other public-use buildings. Because the records were selected purposively rather than through probability sampling, the findings describe the audited group and should not be interpreted as prevalence estimates for all public buildings in the city.

All 53 reports contained a recorded construction year and Form 1 IPR, so each was included in the construction-period and IPR analyses. One report did not contain a generated Form 2A RVS score. That report remained in the analysis of recorded recommendations but was excluded from the numerical RVS summary. Form 2B indicators were analyzed using available-case denominators because several scanned fields were blank or too unclear to read. A missing entry was never counted as evidence that the building complied with the indicator.

To reduce the risk of identifying specific facilities, building names and exact locations were removed from the analytical file and replaced with occupancy categories. The local government retains the building-level crosswalk. The study relied on administrative building records and did not involve human participants or personal identifiers. Documentation of data-use authorization and the institution's ethics review or exemption determination should be kept with the study records and reported in the form required by the target journal.

B. Infrastructure Audit Measures

Form 1 calculates the IPR from five weighted criteria: distance from a known active fault, liquefaction susceptibility, occupancy type, number of occupants, and year of construction [2]. A higher score places a building at a higher relative inspection priority within the audited set. It should not be read as a probability of collapse, a direct measure of structural capacity, or a certificate of safety.

Under the IA construction-year criterion, buildings constructed before 1992 receive 15 points, those constructed from 1992 through 2010 receive 10 points, and those constructed after 2010 receive 5 points [2]. Any comparison of total IPR across these groups therefore partly reflects a weighting already built into the score. Such a comparison can describe how the composite rating behaves, but it cannot isolate the independent effect of building age.

Form 2A applies rapid visual screening using a basic score and modifiers related to structural system, vertical and plan irregularities, construction or code period, and soil or site conditions [2], [3]. In this analysis, scores below 2.0 were kept separate from scores exactly equal to 2.0. Referral status was taken from the recommendation printed in each IA report rather than inferred from the numerical score. The IA framework allows referral for critical conditions beyond the score itself, although the specific trigger was not consistently available in the administrative records [2].

Form 2B records observations on the building premises, emergency exits, fire-safety systems, communication facilities, environmental concerns, and structural or non-structural conditions [2]. Five indicators had enough readable and reasonably standardized entries for analysis: emergency-exit compliance, directional signs, exit signs, exit illumination, and fire-exit doors. These entries were treated as screening observations that still require verification, not as independent regulatory findings.

C. Data Processing and Quality Control

Values were transcribed from the generated reports into a structured analytical file. Construction years, IPR values, RVS scores, categorical entries, and recorded recommendations were then checked against the corresponding Form 1 and Form 2A pages. Entries that were unclear because of scan quality were reviewed again visually. Labels were standardized only for presentation—for example, “5 to 15 km” was written as “5-15 km”—without changing their recorded meaning. Hazard classifications were retained as they appeared in the reports and were not independently checked through geospatial analysis.

For each Form 2B indicator, entries were coded as adverse, compliant, or missing/illegible. This approach ensured that an undocumented field could not be mistaken for a compliant finding. Missing values were not imputed, and the study did not create an overall safety score.

D. Statistical Analysis

Frequencies and percentages were used to describe occupancy, recorded hazard categories, construction period, RVS categories, referral recommendations, and Form 2B observations. Continuous scores were summarized by the mean, standard deviation (SD), median, interquartile range (IQR), and range. The construction-period analysis remained descriptive because construction year is already part of the IPR formula. No inferential test was applied to the comparison between the RVS threshold and recorded referrals: the two outputs are related, one RVS score was missing, and the report-level reasons for referral were not consistently documented.

For Form 2B, the available-case percentage was calculated by dividing the number of adverse findings by the number of readable entries. A second percentage divided the same adverse count by all 53 reports to show how missing documentation affected

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DOI: https://doi.org/10.64388/IREV10I1-1720181

the result. This second value represents the minimum adverse frequency directly observed in the records; it does not assume that missing entries were compliant.

III. RESULTS

A. Building Profile and Form 1 Risk Context

The characteristics of the audited buildings are summarized in Table I.

The audited set consisted of 16 public schools (30.2%), 15 health facilities (28.3%), 12 other public buildings (22.6%), nine government offices (17.0%), and one police or fire facility (1.9%). Forty-one buildings (77.4%) were recorded as being more than 15 km from a known active fault, while 12 (22.6%) were within 5-15 km. Liquefaction susceptibility was classified as moderate for 28 buildings (52.8%) and high for 13 (24.5%). The audit records included a ground-rupture classification field and 28 buildings (52.8%) were recorded as having moderate flood susceptibility. Thirty-five buildings (66.0%) were constructed after 2010, and 11 (20.8%) had an occupant load above 750.

TABLE I. SELECTED CHARACTERISTICS OF THE AUDITED BUILDINGS (N = 53)

Characteristic	n	%
Public schools	16	30.2
Health facilities	15	28.3
Other public buildings	12	22.6
Government offices	9	17.0
Police/fire facility	1	1.9
Within 5–15 km of active fault	12	22.6
High liquefaction susceptibility	13	24.5
Recorded as “ground-rupture prone”	15	28.3
Moderate flood susceptibility	28	52.8
Constructed after 2010	35	66.0
Occupant load above 750	11	20.8

B. Inspection Prioritization and Rapid Visual Screening

The complete Form 1 and Form 2A summary is presented in Table II.

Across the 53 reports, the mean IPR was 53.8 (SD = 9.4), with a median of 53 and an IQR of 48-63. Scores ranged from 33 to 70. Fifteen buildings (28.3%) had an IPR of 63 or higher, placing them at or above the observed third-quartile boundary.

RVS scores were available for 52 reports. Their mean was 2.37 (SD = 0.30), the median was 2.4, and the IQR was 2.4-2.5; scores ranged from 1.0 to 3.0. Two buildings scored below 2.0, two scored exactly 2.0, and the remaining 48 scored above 2.0. One report did not contain a generated numerical score.

TABLE II. SUMMARY OF FORM 1 AND FORM 2A OUTCOMES

Measure	n	Result
Form 1 IPR	53	53.8 ± 9.4; median 53; IQR 48–63; range 33–70
Form 2A RVS	52	2.37 ± 0.30; median 2.4; IQR 2.4–2.5; range 1.0–3.0
RVS < 2.0	2/52	3.8%
RVS = 2.0	2/52	3.8%
Recorded referral	43/53	81.1%

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C. IPR by Construction-Period Classification

Construction-period comparisons are shown in Table III.

The only building constructed before 1992 had an IPR of 65.0. The mean IPR was 55.3 among the 17 buildings constructed from 1992 to 2010 and 52.7 among the 35 buildings constructed after 2010. The pattern is consistent with the Form 1 scoring rule, which gives more construction-year points to older buildings. Still, the pre-1992 figure represents only one building and should not be treated as a stable group estimate. The overlap in total IPR values across the three periods also shows that fault proximity, liquefaction susceptibility, occupancy type, and occupant load contributed to the final ratings.

TABLE III. IPR BY CONSTRUCTION-PERIOD CLASSIFICATION

Construction period	n	Year points	IPR / mean IPR
Before 1992	1	15	65.0 (single record)
1992–2010	17	10	55.3
After 2010	35	5	52.7

D. Numerical RVS Results and Recorded Referrals

Of the 52 reports with generated RVS scores, only 2 (3.8%) fell below 2.0. By comparison, 43 of all 53 reports (81.1%) carried a recommendation for detailed structural evaluation or investigation. Because the recommendation was read directly from the report rather than derived from the score, the large difference confirms that the recorded referral was not simply a restatement of the numerical result. Additional critical conditions in the IA framework may explain the pattern, but the available reports did not consistently identify the reason for each referral. The study therefore could not determine how many referrals arose from any one trigger.

E. Form 2B Egress and Life-Safety Observations

The available-case Form 2B results are summarized in Table IV.

Among readable Form 2B entries, directional signs were absent or deficient in 39 of 41 reports (95.1%); 12 reports had no readable entry for this item. Fire-exit doors were recorded as absent or non-compliant in 35 of 38 readable reports (92.1%), with 15 entries missing or illegible. Deficient exit signs appeared in 40 of 44 readable reports (90.9%), deficient exit illumination in 31 of 37 (83.8%), and non-compliant emergency exits in 18 of 38 (47.4%). When the adverse counts were divided by all 53 reports, the minimum observed frequencies ranged from 34.0% for emergency exits to 75.5% for exit signs. These lower percentages do not treat undocumented entries as compliant; they show how missing records can change the apparent ranking and magnitude of the findings.

TABLE IV. FORM 2B ADVERSE FINDINGS AND DOCUMENTATION MISSINGNESS

Indicator	Adverse/readable	Missing	Adverse/all 53
Directional signs	39/41 (95.1%)	12	73.6%
Fire-exit doors	35/38 (92.1%)	15	66.0%
Exit signs	40/44 (90.9%)	9	75.5%
Exit illumination	31/37 (83.8%)	16	58.5%
Emergency exits	18/38 (47.4%)	15	34.0%

IV. DISCUSSION

A. Risk Profile and Inspection Prioritization

Schools and health facilities made up 31 of the 53 reports (58.5%), so the audited set was concentrated in buildings that provide essential services and may remain important during emergencies. This concentration is useful for local planning, but it also means that the results should not be generalized to the entire public-building stock of Cabanatuan City. Within the audited group, the IPR is best used as a scheduling aid. Buildings at or above the observed third quartile may reasonably be reviewed earlier when engineering resources are limited, provided that the score is not presented as a probability of failure.

The recorded hazard profile shows why no single criterion should drive inspection priority. Although most buildings were listed as more than 15 km from a known active fault, 41 had moderate or high liquefaction susceptibility. A facility may therefore warrant attention because of its site conditions, occupancy, function, or building characteristics even when one hazard measure appears less severe. The audit record classifications were retained as administrative fields and were not independently validated through geospatial analysis.

B. Construction Period and Composite IPR

The construction-period pattern is largely a reflection of how Form 1 is designed. The pre-1992 building received the highest construction-year weight and had an IPR of 65.0, while the two later groups received fewer year points and had lower mean total scores. This does not mean that age, by itself, caused the difference. The 2.6-point gap between the 1992-2010 and post-2010 groups is small relative to the overall IPR range of 33-70, and the oldest group contains only one observation. A later study could subtract the construction-year component from total IPR and compare the remaining criteria, although a larger and more balanced sample would still be needed before drawing conclusions about age.

C. Interpretation of RVS Scores and Referrals

Most RVS scores were clustered between 2.4 and 2.5, and only two fell below 2.0. With so little numerical separation among the majority of reports, the underlying building classification, score modifiers, field notes, photographs, and data completeness become especially important. The report with no generated score is a simple but important reminder that completeness should be checked before RVS outputs are used for scheduling, referral, or public communication.

The clearest operational finding is the contrast between the 3.8% of generated scores below 2.0 and the 81.1% referral rate. A score at or above 2.0 should not be treated as automatic clearance when the same report recommends further evaluation. At the same time, a referral should be understood as a precautionary call for professional review, not as evidence that the building has failed structurally. The absence of a consistently recorded trigger prevents the study from showing whether referrals were related to an unknown building type, adverse soil conditions, pounding or falling hazards, high hazard susceptibility, incomplete information, or another critical concern. Future reports would be more useful if they included a mandatory referral-reason field and a record of the subsequent professional decision.

D. Egress and Life-Safety Priorities

The Form 2B results point to recurring problems in evacuation wayfinding and the readiness of exit systems. Directional signs help occupants follow the route, exit signs identify the final point of egress, and emergency lighting keeps the path visible during a power interruption, smoke event, or nighttime emergency. Fire-exit doors and usable emergency exits are equally important because they affect whether the route remains continuous and functional. The high percentages among readable entries justify prompt verification, but they do not establish the prevalence of these conditions across the city or amount to independent findings of code violation.

Frequency alone should not determine the order of corrective work. A blocked or inoperable emergency exit may appear less often than missing signage but carry a more immediate life-safety consequence. A practical sequence would be to first confirm that every designated exit route is accessible, unobstructed, recognizable, and operational; then correct functional problems involving exits, fire-exit doors, and emergency lighting; next, standardize directional and exit signs along the full travel path; and finally, document the correction and repeat the relevant Form 2B check. Issues involving doors, exit configuration, or structural components should be referred to the appropriate building, fire-safety, or engineering authority.

E. Data Quality and Audit Governance

The missing entries are not merely a technical inconvenience; they are part of the study's findings. Depending on the indicator, 17.0% to 30.2% of Form 2B entries were blank or unreadable. This level of missingness can change the apparent ranking of problems. Directional signs, for example, ranked first among readable entries, while exit signs had the highest minimum observed frequency when the adverse count was divided by all 53 reports. Digital forms with required compliant/non-compliant selections, photographs, short technical notes, inspector identification, and post-correction verification would make future audits easier to interpret and reproduce.

Version control deserves the same attention. Because the reports were generated across 2025-2026, the exact HIAT and Infrastructure Audit Manual version used for each record should be preserved so that changes in scoring logic, hazard inputs, or referral rules can be identified. A complete research archive should include the report date, HIAT version, source documents, data dictionary, quality-control log, and a de-identified analytical dataset.

F. Limitations

Several limitations shape how these results should be read. The reports came from a purposively selected administrative dataset in one city, so they cannot show how common the observed conditions are among all public buildings in Cabanatuan City or in other local government units. The study relied on rapid visual screening and existing records; it did not include a new site inspection, structural analysis, materials testing, geotechnical investigation, or formal compliance inspection. One RVS score was missing, and the Form 2B percentages may be biased if poor documentation was related to building condition. The recorded hazard labels were not independently verified, and the reason for each referral was not consistently available. In addition, construction year is already part of IPR, and only one building belonged to the pre-1992 group. The findings are therefore most appropriately used for screening, prioritization, records improvement, maintenance planning, and professional follow-up.

V. CONCLUSION

The analysis characterized 53 DILG Harmonized Infrastructure Audit Tool reports for selected public buildings in Cabanatuan City. Schools and health facilities accounted for most of the audited set, while the recorded Form 1 criteria showed variation in occupancy, construction period, fault-distance category, liquefaction susceptibility, and occupant load. The mean Inspection Prioritization Rating was 53.8, with scores ranging from 33 to 70. The only building constructed before 1992 had an IPR of 65.0, compared with mean values of 55.3 for buildings constructed from 1992 to 2010 and 52.7 for those constructed after 2010. Because construction year is already included in the IPR formula and the oldest group contained only one record, these differences are descriptive and do not establish an independent effect of building age.

Form 2A results showed a mean RVS score of 2.37 among 52 reports with generated scores. Two reports scored below 2.0, two scored exactly 2.0, and 48 scored above 2.0. In contrast, 43 of all 53 reports carried a recommendation for detailed structural evaluation or investigation. This contrast indicates that the recorded referral was a distinct audit output and was not explained by the numerical RVS category alone. However, because the specific referral trigger was not consistently documented, the study could not determine which additional audit condition accounted for each recommendation.

The readable Form 2B entries most frequently recorded adverse findings involving directional signs, fire-exit doors, exit signs, exit illumination, and emergency exits. Their interpretation was affected by missing or illegible fields, which ranged from 9 to 16 reports depending on the indicator. Overall, the findings describe inspection priorities, seismic-screening outputs, referral patterns, and documented egress conditions within the selected administrative records. They do not estimate conditions for all public buildings in Cabanatuan City and do not constitute a final determination that any individual building is structurally safe or unsafe.

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