# COMMON ISSUES RELATED TO HAZARDS AND VULNERABILITY OF THE POPULATION AND ECONOMY OF THE TURKS AND CAICOS ISLANDS CURRENT AND RECOMMENDED MITIGATION MEASURES

THE TERRITORY OF THE TURKS AND CAICOS ISLANDS IS ONE OF THE (5) REMAINING BRITISH DEPENDENCIES IN THE WEST INDIES SITUATED ON THE NORTHERN MARGINS OF THE CARIBBEAN, ABOUT 575 MILES SOUTH-EAST OF MIAMI IN THE UNITED STATES. PHYSICALLY THE 40 OR SO ISLANDS AND CAYS WHICH MAKE UP THIS GROUP ARE A SOUTHERN EXTENSION OF THE BAHAMAS WHICH THE TURKS AND CAICOS ISLANDS HAVE MAY ETHNIC, SOCIAL AND CULTURAL AFFINITIES. THE ISLANDS ARE SOME 193 SQUARE MILES IN LAND MASS SURROUNDED BY ONE OF THE LONGEST CORAL REEFS IN THE WORLD AND EASILY THE LARGEST OF THE BRITISH DEPENDENT TERRITORIES IN THE CARIBBEAN. HOWEVER BECAUSE OF CLIMATE, SOIL AND GEOLOGY, MANY OF THE ISLANDS REMAIN UNINHABITED. THE POPULATION DENSITY PER PERSON IS ONE OF THE LOWEST IN THE CARIBBEAN.

THE ISLANDS ARE AT A TURNING POINT IN THEIR HISTORY, WHEN THEY HAVE SOME HARD CHOICES TO MAKE. THEY HAVE AN ATTRACTIVE NATURAL ENVIRONMENT. A STABLE POLITICAL SYSTEM AND A HARD CURRENCY. A SIGNIFICANT AMOUNT OF INVESTMENT HAS ALREADY TAKEN PLACE IN THE TOURISM AND OFFSHORE FINANCIAL SERVICES, LEADING TO RAPID GROWTH.

HOWEVER, THERE IS AN EVER GROWING NEED TO SUPPORT AND GUIDE

GOVERNMENT IN PLANNING STRATEGIES TO MESH WITH NATIONAL DEVELOPMENT GOALS WHICH WILL LEAD TO SUBSTANTIAL REDUCTION IN VULNERABILITY. THE LONG TERM, ECONOMIC DEVELOPMENT AND ENVIRONMENTAL PROTECTION ARE MOST LIKELY TO COMPLIMENT EACH OTHER. THIS INTERLOCKING OF ECONOMIC AND ECOLOGICAL SYSTEM WHICH CONSIST OF TOURISM, AGRICULTURE, AND FISHERIES NOT ONLY IMPACT ON THE QUALITY OF THE ENVIRONMENT AND IT PEOPLE, BUT ALSO CRUCIALLY DEPEND ON IT. TOURISM NEEDS INFRASTRUCTURE WHICH MAY CAUSE THE DEPRECIATION OF NATURAL ASSETS, AS IN THE CASE OF SAND MINING FOR BUILDING AND HOTEL CONSTRUCTION AND VARIOUS DEVELOPMENT. ON THE OTHER HAND TOURISTS TRAVEL TO VISIT THE COUNTRY BECAUSE THE COUNTRY PROMOTES ITS SELF AS HAVING THE WORLD'S BEST BEACHES AND UNSPOILED NATURE. THE LEVEL OF TOURISM DEVELOPMENT ACHIEVED SO FAR HAS ALREADY PUT CONSIDERABLE STRAIN ON THE ISLANDS INFRASTRUCTURE AND SOCIAL FABRIC.

IT IS THEREFORE FUNDAMENTAL TO SHOW AT ALL LEVELS OF DECISION MAKERS, FROM THE LEGISLATORS TO PUBLIC AND PRIVATE SECTOR ADMINISTRATORS, HOW ECONOMICALLY BENEFICIAL IT IS TO INVEST IN MEANS OF MITIGATING AGAINST THE RISK OF LOSS OF LIFE AND PROPERTY AND BE EVER MINDFUL THAT SUCH LACK OF ACTION COULD THREATEN PROPERTY AND LIVES. HURRICANES FOR EXAMPLE LIKE MOST TYPES OF NATURAL DISASTERS MAKE IT IMPOSSIBLE TO PREVENT THE ACTUAL GEOLOGICAL OR METEOROLOGICAL PROCESS FROM

OCCURRING, BUT MEASURES TAKEN TO MITIGATE WILL HELP REDUCE THE AFFECT.

HOWEVER, VARIOUS SOCIAL, ECONOMIC, ENVIRONMENTAL AND OTHER DAMAGE IS FREQUENTLY CAUSED BY HURRICANES AND NATURAL DISASTERS AND WHERE AS PRESERVATION OF LIFE REMAINS PERMANENT IN THE HURRICANE WARNING PROCESS, THE ECONOMIC FACTORS MUST ALSO RECEIVE SERIOUS CONSIDERATION, NOT ONLY FOR DIRECT, BUT ALSO FOR INDIRECT EFFECTS ON HUMAN RESPONSE. PEOPLE WILL NOT CONTINUALLY TAKE EXPENSIVE ACTION WHICH, AFTERWARDS, PROVE TO HAVE BEEN, UNNECESSARY.

IF EXISTING LEVELS OF RISK ARE TO BE REDUCED, SOUND BUILDING PRACTICES AS A MITIGATION MEASURE FOR NATURAL DISASTERS WILL CONTINUE TO BE A FUNDAMENTAL PART OF COMPREHENSIVE DEVELOPMENT AT ALL LEVELS SO AS TO AVOID A SITUATION WHERE DISASTER RELIEF BECOMES SYNONYMOUS WITH DEVELOPMENT ASSISTANCE, AND WHERE POST DISASTER RECONSTRUCTION DEPLETES SCARCE RESOURCES OTHERWISE DESTINED FOR NEW INVESTMENTS.

IN VIEW OF THE IMPORTANCE OF THE ENVIRONMENT FOR THE GROWING PROSPECTS OF THE TURKS AND CAICOS ISLANDS, AND THE LINKS TO THE ECONOMIC POLICIES PURSUED, IT IS NOW IMPORTANT TO BRIEFLY DESCRIBE THE ECOSYSTEM IN THE TURKS AND CAICOS REGION IDENTIFYING LINKAGES BETWEEN ECONOMIC ACTIVITY AND

ENVIRONMENTAL DEGRADATION, ASSESS THE IMPACT OF SUCH DETERIORATION AND VULNERABILITY OF THE POPULATION AND ECONOMY; DISCUSS MITIGATION ACTIVITIES AND HIGH LIGHT THE PRIORITIES FOR MITIGATION THAT COULD BE REACHED BY THE END OF THE DECADE. THE VARIOUS ISSUES ARE, COASTAL ZONE DEGRADATION, BEACH EROSION, LAND USE MANAGEMENT, LEGISLATION, EDUCATION AND ENFORCEMENT OF EXISTING REGULATIONS.

**ACTION TAKEN**

THE MEASURES TAKEN ARE AS FOLLOWS:-

1. ENGINEERING AND CONSTRUCTION MEASURES
2. PHYSICAL PLANNING MEASURES
3. ECONOMIC MEASURES
4. MANAGEMENT AND INSTITUTIONAL MEASURES
5. SOCIETAL MEASURES

1. **ENGINEERING AND CONSTRUCTION MEASURES**

NEW PLANNING REGULATIONS AND GUIDELINES HAVE BEEN INTRODUCED TO IMPROVE THE DESIGN AND CONSTRUCTION OF BUILDINGS.

2. **PHYSICAL PLANNING MEASURES**

LAND ZONING FOR DOMESTIC AND INDUSTRIAL SITES ARE ALREADY IN PLACE AND CAREFUL LOCATION OF PUBLIC SECTOR FACILITIES SUCH AS SCHOOLS, HOSPITALS, EMERGENCY

FACILITIES INCLUDING INFRASTRUCTURE ELEMENTS HAVE BEEN GIVEN ATTENTION.

3. **ECONOMIC MEASURE**

TO SOME EXTENT THE ECONOMIC DEVELOPMENT IS BEING SHARED THROUGHOUT THE ISLANDS. HOWEVER THERE IS NEED TO ENCOURAGE THIS PARTICULAR PRACTICE AS EQUITABLE ECONOMIC DEVELOPMENT IS THE KEY TO DISASTER MITIGATION AND DIVERSIFICATION OF ECONOMIC ACTIVITY IS AS IMPORTANT AN ECONOMIC PRINCIPLE AS DECONCENTRATION AS IN PHYSICAL PLANNING. TOURISM AS AN ECONOMIC SECTOR IS EXTREMELY VULNERABLE TO A DISASTER, OR EVEN THE RUMOUR OF A POTENTIAL DISASTER.

4. **MANAGEMENT AND INSTITUTIONAL MEASURES**

THE INSTITUTION OF DISASTER MITIGATION REQUIRES A CONSENSUS OF OPINION THAT EFFORTS TO REDUCE DISASTER RISK ARE OF CONTINUAL IMPORTANCE. THE OBJECTIVES AND POLICIES THAT GUIDE THE MITIGATION PROCESSES HAVE BEEN SUSTAINED OVER THE YEARS AND HAVE SURVIVE THE CHANGES IN POLITICAL ADMINISTRATIONS OVER THE YEARS.

5. **SOCIETAL MEASURES**

PUBLIC AWARENESS CONTINUES TO BE AN IMPORTANT FUNCTION WHERE BY PEOPLE ARE INFORMED OF THE NECESSARY STEPS THAT

CAN BE TAKEN TO PROTECT THEMSELVES, AND THEIR PROPERTY AS WELL AS GIVING THE NECESSARY SUPPORT AND EFFORTS MADE ON THEIR BEHALF TO PROTECT THEM. MOST EDUCATIONAL PROGRAMS TO DATE HAVE RIGHTFULLY BEEN DIRECTED AT THE PROTECTION OF LIFE AND PROPERTY.

THE ADDITIONAL PRIORITIES FOR MITIGATION THAT COULD BE REACHED BY THE END OF THE DECADE ARE AS FOLLOWS:-

NATIONAL

1. THE INTRODUCTION OF LEGISLATION AND REGULATIONS FOR THE PROTECTION OF THE COAST LINE.
2. VULNERABILITY ANALYSES.
3. A REVIEW AND REVISION OF EXISTING LEGISLATION AND REGULATIONS RELATED TO BUILDING CONTROL AND CONSTRUCTION IN GENERAL.
4. ENVIRONMENTAL SENSITIVE MAPPING/HAZARD MAPPING BY ISLAND.
5. A REVIEW OF PUBLIC EDUCATIONAL AND AWARENESS PROGRAMMES TO CONTINUE.
6. INSPECTION AND MONITORING PROGRAMMES.
7. ONGOING ENFORCEMENT OF BUILDING CODE AND REGULATIONS
8. THE ACQUISITION OF TRAINING AND EQUIPMENT.

INTERNATIONAL

AS A DEPENDENT TERRITORY OF THE UNITED KINGDOM, THE TURKS AND CAICOS ISLANDS WILL SEEK TO ESTABLISHED A FORMAL ASSOCIATION OF NATIONAL DISASTER COORDINATORS WITH THE FOUR OTHER DEPENDENT TERRITORIES AND BERMUDA WITH A VIEW TO MAXIMIZING THE LIMITED RESOURCES AVAILABLE AND TO AVOID DUPLICATION WHERE POSSIBLE.

BUILDING CODE

SOME OF THE WORK WITH RESPECT TO THE BUILDING CODE IS SET OUT IN THE REST OF THIS DOCUMENT. THE REASON THIS WORK WAS CARRIED OUT IS ALSO SET OUT HEREIN.

# BUILDING INSPECTION PROCEDURES

## BACKGROUND

Development Control is the process which ensures that development is carried out in accordance with approved plans. Part 1 of the Physical Planning Ordinance 1989 defines development as the carrying out of building, engineering, mining or other operations in, on, over, or under any land.

Part VIII, No. 66, of the Planning Ordinance also states that no person shall commence construction of a building without first obtaining a Grant of Detailed Development Permission and Building Permit in respect of the development.

## APPROVED DEVELOPMENT

Applications once approved and granted Detailed Development Permission and Building Permit are despatched to the applicant with the following:-

1. Notice of Detailed Development Permission

2. Notice of Building Permit

3. Site Clearance Form

4. Set of Request for Mandatory Inspection Cards. These cards are labelled with the stages of inspections to be carried out by the Development Control Officer. The builders\owners are required to complete and submit the appropriate cards at least 48 hrs prior to the date required for inspections to be carried out.

5. A standard letter briefly outlining the stages when inspections should be carried out, and a footnote informing owners\builders to display their Building Permit Number on site.

6. Report of Site Inspection Form.

## SITE INSPECTIONS

In accordance with Section 67.8 of the Building Regulations 1990 and Section 104.1 of the Turks and Caicos Islands Building Code, it is mandatory upon 48 hours notice from owners\builders\contractors (exclusive of Saturdays, Sundays and declared Public Holidays) for the Development Control Officer to carry out the inspections listed below to ensure compliance with the approved plans and the Building Code and Guidelines.

### 1. SITE CLEARANCE

Approval must be obtained from the Development Control Officer prior to the commencement of site clearance and a site inspection has to be carried out to ensure that the site in question is the correct one.

When possible, site clearance must be limited to the specific area where the building will actually be located.

It is recommended, where possible, that all trees over 6ft tall be removed only with the consent of the Department of Planning.

### 2. SETTING OUT INSPECTION

This inspection is carried out after site clearance, and the stakes and batten boards defining the layout of the proposed building are clearly and firmly in place.

The site boundaries are to be clearly marked so that the Development Control Officer can determine that the proposed building will be adequately setback from the site boundaries.

This inspection ensures that there has been compliance with the approved plans with respect to the building size, shape and boundary setbacks.

### 3. FOUNDATION EXCAVATION AND REINFORCEMENT PLACING

Foundation inspection is carried out when the necessary excavations have been completed, forms erected and

adequate reinforced steel are in position in accordance with approved plans. The following are checked during inspection:

(i) The depth, width and soil/earth formation of excavations.
(ii) The placing, sizing and fixing of reinforcement.
(iii) The installation of a vapour barrier, depending on the location of the building.
(iv) The location of starter bars with respect to the positioning of columns.

NOTE:- All reinforcement must be lifted to a minimum of 2ins - 3ins off the bottom of the trenches.

## 4. FLOOR SLAB INSPECTION

Inspection for floor slab is carried out after the backfill is well compacted and reinforced by Welded Wire Mesh (WWM). In some cases where moisture is present a vapour barrier (visqueen) is laid over the compacted fill. Also, in some cases, all electrical roughing in and plumbing services must be in place.

Checks are carried out to ensure that the wire mesh is properly laid and has maximum cover and lapping before pouring concrete.

On suspended floor slabs, checks are made for reinforcement size or gauge, spacing, lapping, ties and cover. It is at this stage that formwork supports are also checked to ensure proper shoring.

NOTE:- Inspections are carried out at all floor levels for buildings of more than 1 storey. At no time should ANY concrete be poured, or internal work covered prior to inspections being carried out by the Electrical Inspector (in the case where electrical roughing in are in place ) and the Development Control Officer.

## 5. PLUMBING AND ELECTRICAL ROUGHING IN INSPECTION

Electrical inspections shall be made at various stages as agreed by the Electrical Inspector. The stages are as follows:

(i) Roughing - in
(ii) Conductors installation and joints
(iii) Final inspection

NOTE: Before temporary electricity can be supplied to a construction site, Form 'A', Specifications of Electricity, is stamped by the Department of Planning to ensure that the Development was approved by the Physical Planning Board.

Plumbing Inspection is carried out to ensure that the workmanship is sound and the layout of the system is as per design of approved plans.

Checks are made on all pipelines to ensure compliance with the requirements of the Building Code/Guidelines.

## 6. WALLS COLUMNS AND BEAMS INSPECTION

### 6.a WALL (MASONRY) INSPECTION

This inspection is carried out during the block work stages. The following are examined:

(i) Walls for level and plumb within tolerances
(ii) Masonry units, mortar and grout
(iii) Width of mortar joints
(iv) That reinforcing steel is properly placed and lapped in accordance with specifications
(v) Head joints and mortar joints

### 6.b WALLS (TIMBER) INSPECTION

All timber constructed walls must be properly braced. Checks are carried out to ensure the following:

(i) That the studs are properly spaced
(ii) That there is proper diagonal bracing at all corners
(iii) Connections at stud to floor plate and stud to wall plate
(iv) Anchorage of floor plate to foundation slab

6.c COLUMNS INSPECTIONS

Inspections are carried out for columns after the masonry walls have been constructed. The Officer checks that:

(i) The reinforcing steel are of the proper gauge and are properly tied.
(ii) The stirrups are spaced as specified on the approved plans.
(iii) There is proper cover of reinforcement from the formwork.

6.d STRUCTURAL COLUMN INSPECTION

This inspection of the structural columns is carried out before block laying is in place and before formwork is completely in place. Checks are made to ensure that:

(i) The reinforcement is adequate.
(ii) The stirrups are of the correct gauge and are properly placed.
(iii) The reinforcement has adequate cover from the formwork.
(iv) The spacing of the structural columns conforms to the approved plans.

6.e LINTEL BEAM AND RING BEAM INSPECTION

Inspection of the lintels and belt beam is carried out on completion of blockwalls and tie columns. The following are checked:

(i) Size of beams, reinforcement and gauge.
(ii) The placement of stirrups.
(iii) The reinforcement is properly covered from the formwork.

7. ROOF STRUCTURE INSPECTION

The roof as we all know is perhaps the most vulnerable part of the structure in term of its resistance to Hurricane Winds. Inspections are carried out during the structural framework to ensure that the following are in

accordance with the Building Code/Guidelines and approved plans :-

(i) Anchor bolts are properly bolted to wall plate.
(ii) Correct rafter members and rafter spacing.
(iii Decking and covering of roofing material.
(iv) Rafters are properly connected/bolted to wallplate with acceptable connectors (Hurricane straps).
(vi) Horizontal diagonal bracing on truss roof systems

. FINAL INSPECTION

On completion of all construction work, no new building shall be occupied until a final inspection is carried out by:

(i) The Electrical Inspector
(ii) The Environmental Health Officer
(iv) The Development Control Officer

Owners\contractors should request a final inspection on the appropriate Card #7. Following the final inspection of a building which has been constructed in accordance with the approved plans and the Building Code and Guidelines, the Development Control Officer submits a report to the Director of Planning recommending that a Completion\Occupancy Certificate be issued.

NOTE :- Owner\Contractor is to ensure that the general requirements of the National Electrical Code (NEC), Turks and Caicos Utilities/Provo Power Company standards are met to ensure service installation.

## 8. SPECIAL INSPECTION

A special inspection, in addition to the required inspections, can be requested at any stage of the development if the owner/builder sees it necessary.

## 9. OTHER INSPECTIONS

Although cards are not issued for the inspection of the water cistern, septic tank and soakaway pit,

owners/contractors are required to inform the Development Control Officer of commencement of construction so that the necessary inspections can be carried out to ensure compliance with the Building Code and Guidelines and to ensure that the requirements of the Environmental Health Department are maintained.

## 9.a WATER CISTERN INSPECTION

Water cisterns are an integral part of every development in the Turks and Caicos Islands and are a standard requirement. This is necessary due to the low rainfall in the Turks and Caicos Islands.

The size of the water cistern is calculated on the basis of 7 U.S. gallons per square foot of roof area. This is checked with the approved plans to ensure conformity

The Officer checks to ensure that there is proper spacing of reinforcement in floor slabs and walls; the access hatch is constructed with preferably two chambers so as to allow for the cleaning of the cistern without losing all the water.

## 9.b SEPTIC TANK AND SOAKAWAY INSPECTIONS

The Guidelines and Building Code give two methods of calculating size of septic tank for homes and small commercial buildings.

There are also two methods of disposing of the effluent from the septic tank:

(i) Tile Field
(ii) Soakaway

The method of effectively disposing of the effluent depends on the type of soil and the location of the site in which the system is constructed.

All inspections of sewage disposal systems are done by the Environmental Health Department. Sewage systems, when inspected, must meet the requirements of the Building Code and Guidelines.

It must be noted that the Health Department recommends the use of leachfields in most cases.

## SAFETY AND HEALTH ON SITE

During construction activity the Development Control Officer will enforce at all times safety precautions, sanitation and general cleanliness on site.

## NOTICE TO REMOVE OR ALTER WORK

Under Section 70 of the Physical Planning Ordinance, the Physical Planning Board may by Notice require the owner of a property, either to pull down or remove work as may be necessary, to ensure compliance with the Building Regulations, approved plans, Building Code and Guidelines.